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Preliminary results from the ecosystemic survey in August 2020 in the Estuary and northern Gulf of St. Lawrence

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Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

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ABSTRACT

Fisheries and Oceans Canada conducts an annual multidisciplinary survey in the Estuary and northern Gulf of St. Lawrence. The objectives of this survey are varied; assess the biodiversity of species found near the bottom; estimate the abundance of groundfish and invertebrates; assess physical and biological (phytoplankton and zooplankton) oceanographic conditions; monitor the pelagic ecosystem; and collect samples for various research projects. In 2020, the survey was conducted between August 12 and September 5 on board the CCGS *Teleost*. Due to the context of the Covid-19 pandemic, the number of days at sea and the number of scientists on board the ship had to be reduced. The survey successfully carried out 147 trawl tows as well as 66 CTD water column casts, and 34 zooplankton samples.

This report presents the results of the 147 tows. In total, 78 fish taxa and 206 invertebrate taxa were identified during the mission. Historical perspectives (catch rates, spatial distribution and length frequency) are presented for 25 taxa. These commercial fishery-independent data will be used in several stock assessments including cod (*Gadus morhua*), redfish (*Sebastes spp.*), Greenland halibut (*Reinhardtius hippoglossoides*), Atlantic halibut (*Hippoglossus hippoglossus*), witch flounder (*Glyptocephalus cynoglossus*) and northern shrimp (*Pandalus borealis*).

A preliminary analysis of water temperature data collected in 2020 shows that conditions have warmed at 150 m and deeper, reaching new records since 1915 at 200 and 300 m. The cold intermediate layer was warmer in 2020 than in 2019 except in the Estuary where it remained stable. Surface waters were also warmer than normal, by 1.5°C, in July-August.

INTRODUCTION

Fisheries and Oceans Canada conducts an annual bottom trawl survey in the Estuary and the northern Gulf of St. Lawrence. This is a multi-species, commercial fishery-independent survey. Its purpose is to assess the ecosystem with consistent and standardized protocols. This survey examines, among other things, spatial and temporal changes in the distribution and relative abundance of fish and their assemblages. It also aims to gather information on the biological parameters of commercial species.

The main objectives are to:

1. assess groundfish and Northern Shrimp population abundance and condition;
2. assess environmental conditions;
3. conduct a biodiversity inventory of benthic and demersal megafauna;
4. assess phytoplankton and mesozooplankton abundance;
5. monitor the pelagic ecosystem;
6. conduct an inventory of marine mammals (cancelled in 2020);
7. conduct an inventory of seabirds (cancelled in 2019 and 2020);
8. collect samples for various research projects.

In 2020, the survey was conducted between August 12 and September 5 onboard the CCGS *Teleost* (mission IML-2020-012). This mission took place in the context of the Covid-19 pandemic. Sanitary measures had to be put in place so that the mission could be carried out.

First, the number of days at sea has been reduced from 33 to 25 days so that the science crew boarding coincides with the crew change of the CCGS *Teleost*. So we were going to create a "bubble" with the two crews throughout the duration of the mission. It was therefore not possible to disembark or make crew changes. Normally, at mid-survey there is a change of science team. In the end, following the reduction in the duration of the mission, 147 fishing stations were successfully carried out, while on average around 190 stations are made.

The science crew has also been reduced from 15 to 9 scientists. Observers for marine mammals and seabirds did not participate to the survey, so the objectives of inventorying these species could not be achieved. The number of oceanographers has been reduced from 2 to 1. There is normally an oceanographer on duty at all times. With this reduction, oceanographic activities had to be reduced and focused on daylight hours. In the end, the number of vertical water column profiles (CTDs) was reduced by approximately 33% and the numbers of zooplankton samples were reduced by more than 50%. The number of scientists on the fishing team has been reduced by 3 people. This reduction has resulted in a review of the fish and invertebrate sampling protocols. The number of biological characteristics measured on fish and invertebrates has been reduced, for example, there have been no individual weights collected for non-commercial species, no individual length measurements of sea pens, otoliths of Greenland halibut and witch flounder were not collected. In addition, the number of protocols for collecting samples for DFO and academia research projects has been reduced. Finally, the shrimp samples were not measured during the mission but were brought back to the laboratory and were analyzed in the fall.

SURVEY DESCRIPTION

The survey covers the waters of the Laurentian Channel and north of it, from the Lower Estuary in the west to the Strait of Belle Isle and the Cabot Strait in the east, namely, the Northwest Atlantic Fisheries Organization (NAFO) divisions 4R, 4S and the northern part of 4T (Figure 1). Since 2008, the coverage of division 4T has been increased in the upstream part of the Lower Estuary in order to sample the depths between 37 and 183 m. The study area is 118,587 km^2.

A stratified random sampling strategy was used for this survey. This technique consists in subdividing the study area into more homogeneous strata. The area was divided into 54 strata, which were divided based on depth, NAFO division and substrate type (Figure 2). A total of 200 trawl stations was initially allocated in the study area, which is a number proportional to the stratum surface, with a minimum of two stations per stratum. The tow positions were chosen randomly within each stratum. Since 2014, a new rule was added to respect a minimum distance of 10 km between stations in the same stratum.

The fishing gear used on the CCGS *Teleost* is a four-sided Campelen 1800 shrimp trawl equipped with a Rockhopper footgear (“bicycle”) (McCallum and Walsh 2002). The trawl lengthening and codend are equipped with a 12.7-mm knotless nylon lining. Standard trawling tows last 15 minutes, starting from the time the trawl touched the sea floor as determined by the *Scanmar*™ hydroacoustic system. Towing speed is 3 knots. Information on trawl geometry (horizontal spread of the doors and wings, vertical opening of the trawl, depth) was recorded for each tow using *Scanmar*™ hydroacoustic sensors mounted on the fishing gear.

In 2020, 147 fishing stations were successfully completed (52 in 4R, 62 in 4S and 33 in 4T), which represent 40 stations less than what has been achieved on average since 1990 (Annex 1). The decrease in the number of stations completed was caused by a shortening in the duration of the survey by 8 days. A lot of effort was made to cover the entire study area. Eleven strata were not sampled with a minimum of two stations (Figure 3, Appendix 1). These partially or uncovered strata were distributed throughout the study area and not located in a particular sector.

For each fishing tow, the catch was sorted and weighed by taxa; biological data were then collected on a sub-sample. For fish, crab and squid, size and weight were gathered by individual. For some species, sex, maturity, and the weight of certain organs (stomach, liver, gonads) were also evaluated. Count of soft rays of the anal fin for redfish was conducted to separate the two species. Otoliths were saved for cod and Atlantic halibut to conduct ageing analysis. A sample of approximately 2 kg of shrimps was frozen for laboratory analysis at the Maurice Lamontagne Institute where the sample was sorted and weighed by species and by stage of maturity for the northern shrimp. The shrimps were measured individually. The other invertebrates were counted (no individual measurements) and photographed. The photos are archived in a photo catalogue with associated keywords (taxonomic identification, station description, date, etc.).

Since 2001, digital photos have supported an increased effort in the identification of species. These additional efforts have targeted fish since 2004 (Dutil et al. 2009) and invertebrates since 2005 (Nozères et al. 2014). An identification guide for marine fishes in the estuary and northern Gulf of St. Lawrence (Nozères et al. 2010), a shrimp atlas (Savard and Nozères 2012) and a guide for invertebrates (Nozères and Archambault 2014) were used during the mission to identify most taxa. The taxon codes and their names follow the list of Miller and Chabot (2014), with annual updates according to the World Register of Marine Species (WoRMS).

Additional samples were taken for various scientific projects:

9. Water samples for genetic analysis of environmental DNA;

10. Samples of herring, capelin and mackerel for maturity determination;
11. Beluga and marine mammal preys (several fish species and northern shrimp) in order to follow the evolution of isotopic signatures of key species in the St. Lawrence ecosystem;
12. Stomachs of several fish species in order to describe their diet;
13. Samples of small demersal fish;
14. Blood samples from Atlantic halibut and Greenland halibut to characterize the state of health of the ecosystem from molecular markers;
15. Small redfish (< 11 cm) for genetic identification of the species (*Sebastes fasciatus* and *S. mentella*) and the population of new cohorts observed in the Gulf;
16. Monitoring redfish growth from the 2011 cohort;
17. Atlantic halibut, Greenland halibut and thorny skate gonad samples to determine stage of maturity;
18. Squid samples to study its trophic role in the ecosystem;
19. Sponges (Porifera) for identifications;

Oceanographic conditions such as temperature, conductivity (salinity), turbidity, dissolved oxygen, luminosity and fluorescence were sampled during this survey. A total of 55 vertical profiles of the water column were done at the fishing stations and 11 more on extra stations that fall under the Atlantic Zone Monitoring Program (AZMP). The various equipment, *CTD SeaBird 911Plus*™, dissolved oxygen sensor (*SBE 43*), photometer (*Biospherical*) and fluorometer (*Eco-FLNTU Wetlabs*) were coupled to the rosette of Niskin bottles. For each profile obtained using the rosette, water samples were also taken at several depths to determine their salinity, pH, dissolved oxygen concentration (Winkler titration), nutritive salt content (nitrite, nitrate, phosphate, silicate) and chlorophyll content. In addition, a *CTD SBE 19Plus*™ device (temperature and salinity), coupled to a dissolved oxygen sensor (*SBE 63*), was also installed on the back of the trawl, thereby allowing oceanographic data to be collected for the 147 fishing tows.

To study of zooplankton distribution and biomass for the study area consisted of vertical tows from the sea floor to the surface using a zooplankton net (202 µm) at 34 stations.

Water column hydroacoustic data at four frequencies (38, 70, 120 and 200 kHz) were recorded using a *SIMRAD™ EK60* echosounder during the entirety of the mission. These data will be used to develop a three-dimensional database to map the pelagic ecosystem.

DATA ANALYSIS

The analysis of 2020 abundance and biomass data was integrated into the combined annual summer survey series initiated in 1990. These combined series were developed following a comparative study between the two vessel-gear tandems (1990-2005: CCGS *Alfred Needler – URI 81'/114'* trawl; 2004-2020: CCGS *Teleost – Campelen 1800* trawl) to establish specific correction factors for about twenty species caught (Bourdages et al. 2007). Results from this study led to an adjustment of *Needler* catches into *Teleost* equivalent catches.

Given that over the years, some strata were not sampled by a minimum of two successful tows (Appendix 1), a multiplicative model was used to estimate their catch rate indexes in number and weight. This model provided a predicted value for strata with less than two tows with the data of the current year and the previous three years. Thus, indicators presented for the series are representative of a standard total area of 116 115 km^2, the sum of the area of all strata. In addition, reference points were also added to the catch rate figures. The solid line represents the 1990-2019 period average (long-term average) and the two dotted lines associated to the mean ±0.5 standard deviation corresponding respectively to the upper and lower reference limits.

Note that the distinction between the two redfish species, *S. fasciatus and S. mentella*, is based on the analysis of the soft anal fin rays count and the depth of capture of individuals (H. Bourdages, DFO Mont-Joli, pers. comm.).

Length frequency distributions are presented in two different forms. The first figure shows the distribution for the last two years of the series plus the average distribution for the 1990-2019 period (long-term average distribution). Frequency values are expressed as the average number of individuals caught per tow in increment of 1 cm, except for the northern shrimp (0.5 mm) and Atlantic halibut (3 cm). The second figure represents the length distributions in length mean per class length for each year of the historical surveys series (1990 to 2020).

The geographical distribution of catches by weight per tow (kg/15 minutes tow, except for sea pens number/15 minutes tow) was made for periods of four or five years. The interpolation of CPUE (catch per unit of effort) was performed on a grid covering the study area using a ponderation inversely proportional to the distance (R version 2.13.0, Rgeos library; R Development Core Team 2011). The isoline contours were then plotted for four CPUE levels which approximate the 20^{th}, 40^{th}, 60^{th} and 80^{th} percentiles of the non-zero values. The catch rate distribution for the 2019 survey only is also presented in a bubbles type map.

The preliminary results for the abundance and biomass indices, the catch rate distribution maps, and the size frequency distributions for about 25 taxa commercially fished are presented at figures 5 to 62. These results are preliminary and must be considered as such until validations and laboratory analyses have been completed.

The distribution of total species richness and species richness of 3 taxonomic groupings is presented in figures 63 to 66. Species richness is expressed as the number of species collected, total or per grouping, at each station in 2020. Taxonomic groupings were made to observe specifically the distribution of species richness for species with similar ecological characteristics: fishes, shrimp and invertebrates (excluding shrimp).

The average weight per tow for 57 taxa of fish and 99 taxa of invertebrates is given in figures 67 and 68. In these figures, a color code is used to represent the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

The catches per tow for fish taxa are available on the St. Lawrence Global Observatory (SLGO).

Finally, Appendix 2 provides a list of all taxa, vertebrates and invertebrates, caught among the 147 successful tows achieved during the 2020 survey. The occurrence, or the number of tows where the species was identified, as well as the total catch, by weight and numbers, are also presented. The number of specimens measured per taxon and some descriptive statistics for the length parameter are also presented in Appendix 3.

RESULTS

Warning: the bottom trawl survey is designed to sample demersal species. However, catches may also include pelagic species and species associated with coastal or rocky habitats which are more difficult to trawl. Although these taxa are found in catches, they have a low catchability by trawl net. Some caution is required when interpreting the results obtained for these taxa.

BIODIVERSITY

In total, 78 fish taxa and 206 invertebrate taxa were identified in 2020 (Appendix 2).

In 2020, the biomass of the two redfish species combined accounted for 90% of the biomass of all captured organisms, while it averaged 15% between 1995 and 2012 (Figure 4). The Atlantic redfish (*Sebastes mentella*) constituted, alone, more than 85% of the catches made during the survey.

Species richness is particularly high near the coasts such as north of Anticosti, the Strait of Belle Isle and southwest of Newfoundland (Figure 63). The Strait of Belle-Isle is particularly diverse in terms of invertebrates (Figure 65) and shrimps (Figure 66), many species of which cannot be found anywhere else. This high richness is imputable to the Labrador Current entering the Gulf by the Strait of Belle Isle which allows the establishment of arctic species in this area. Similarly, areas rich in fish species are seen at the Cabot Strait at great depths (Figure 64). At these stations, the presence of rare species coming from the depths of the Atlantic can be observed.

Fish

The abundance and the biomass of the **black dogfish** (*Centroscyllium fabricii*) have been above average for the past nine years (Figures 5 to 7).

Capelin (*Mallotus villosus*) was mainly distributed from the Estuary to Anticosti Island during the 2020 survey. We note its almost absence in the catches along the North Shore east of Havre-Saint-Pierre and in the Strait of Belle Isle whereas capelin is normally a regular catch in these regions (Figure 8).

For the past thirteen years, abundance and biomass of **Atlantic halibut** (*Hippoglossus hippoglossus*) has remained above the series average (Figures 9 to 11).

The abundance and biomass of **Greenland halibut** (*Reinhardtius hippoglossoides*) are increasing from 2019. In 2020, abundance is slightly above average and biomass is equal to average. The size frequency distributions indicate that the 2019 cohort (16 cm mode) is below the series mean in abundance while the abundance of fish 22 cm to 39 cm is above this mean (Figures 12 to 14).

The **lumpfish** (*Cyclopterus lumpus*) was a rare but regular catch in this survey. Abundance and biomass have been above the series average since many years (Figures 15 to 17).

Atlantic herring (*Clupea harengus*) was a frequent catch in this survey and was distributed throughout the northern Gulf of St. Lawrence with the exception of the depths of the Laurentian Channel. The highest catches are observed along the west coast of Newfoundland (Figure 18).

Atlantic wolffish (*Anarhichas lupus*) and **spotted wolffish** (*Anarhichas minor*) were caught on 24 and 6 occasions, respectively in 2020. These catches were mainly distributed in the northern eastern part of the Gulf of St. Lawrence (Figures 19 and 20).

Since 2007, **silver hake** (*Merluccius bilinearis*) has been more common in the northern Gulf, before it was only occasionally observed (Figures 21 to 23).

The abundance and biomass of the **longfin hake** (*Phycis chesteri*) are near the average in 2020 (Figures 24 to 26).

The abundance and biomass of **white hake** (*Urophycis tenuis*) has been above or equal the average since eight years (Figures 27 to 29).

In 2020, the abundance and biomass indices of **cod** (*Gadus morhua*) increased, the abundance index is above average while the biomass index is similar to the average of the series. A length frequency mode is observed from 22 to 29 cm (juvenile cod). The geographic distribution of catches in 2020 is comparable to previous years (Figures 30 to 32).

American plaice (*Hippoglossoides platessoides*) was frequently caught and its abundance is stable and above average (Figures 33 to 35).

Witch flounder (*Glyptocephalus cynoglossus*) was frequently caught. The strong cohorts from 2007 and 2009 have contributed to the increase in biomass; these fish are now larger than 30 cm (Figures 36 to 38).

Thorny skate (*Amblyraja radiata*) and **smooth skate** (*Malacoraja senta*) were both very frequently caught. The abundance of thorny skate is increasing and decreasing for smooth skate (Figures 39 to 44).

Arctic cod (*Boreogadus saida*) is a small cold water demersal fish. Catches in recent years have been made in the Estuary, along the North Shore and on the west coast of Newfoundland (Figures 45 to 46).

Acadian redfish abundance (*Sebastes fasciatus*) is near the average of the time series, while biomass is above the latter (Figures 47 to 49).

Three strong cohorts (2011, 2012 and 2013) of **Atlantic redfish** (*Sebastes mentella*) have contributed to the increase in abundance and biomass since 2013. The 2011 cohort, which is the most abundant, now has a modal size of 23 cm. These redfish are distributed throughout the channels of the northern Gulf of St. Lawrence (Figures 50 to 52).

Invertebrates

The three most abundant **shrimp** species in the deep waters of the northern Gulf of St. Lawrence, namely northern shrimp (*Pandalus borealis*), striped pink shrimp (*Pandalus montagui*) and pink glass shrimp (*Pasiphaea multidentata*), have been declining for several years (Figure 68).

The abundance and biomass of the **northern shrimp** (*Pandalus borealis*) has declined significantly since 2003 to reach the lowest values in the historical series since 2017 (Figures 53 to 55).

Northern shortfin squid (*Illex illecebrosus*), a seasonal pelagic species from the south, has been present in over 50% of the tows since 2017 in all areas except the estuary and Strait of Belle Isle. This strong squid presence had not been observed for several years (Figures 59 to 61).

For the second year in a row, a **lobster** (*Homarus americanus*) was caught in the study area at a depth of over 300 m between the northern Gaspé Peninsula and Anticosti Island. No lobster was caught during this survey prior to 2019 (Annex 2).

Four species of **sea pens** were present in the northern Gulf of St. Lawrence. The larger sea pens (*Anthoptilum grandiflorum, Halipteris finmarchica, Pennatula grandis*) are distributed in the deeper areas of the Laurentian Channel, while the spiny sea pen (*Pennatula aculeata*) had a more widespread distribution within the survey (Figures 59 to 62).

PHYSICAL OCEANOGRAPHIC CONDITIONS

A preliminary analysis of water temperature data collected in 2020 (Figures 69 and 70) shows that conditions have warmed at 150 m and deeper, reaching new records since 1915 at 200, 250 (not shown) and 300 m (note that these annual record may change with the addition of data sampled during the fall). Compared to conditions observed in August 2019, waters at 200 and 300 m have warmed by about 0.2°C and by 0.3 and 0.4°C at 250 and 150 m where inter-annual variability is higher. The August cold intermediate layer (CIL) minimum temperature was much warmer in 2020 than in 2019 except in the Estuary where it remained stable. Surface waters were also much warmer than normal, by 1.5°C, in July-August.

Air temperatures over the Gulf were below normal in April 2020, near normal in May and July and above-normal in June and August. This led to above normal average surface water temperatures for the period of May–August (+1.0 standard deviations [SD] relative to the 1982–2010 climatology and +0.8°C) as well as for July–August (+2.0 SD; +1.5°C).

At the end of winter 2020, the volume of water in the surface mixed layer with temperatures lower than -1°C was near the climatological mean, forecasting a warming of the summer Cold Intermediate Layer compared with 2019 conditions. Its average minimum temperature of -0.1°C, estimated for 2019 using only data from the August survey, was 0.3°C warmer than 2019 conditions, and was above-normal (+0.7 SD; Figure 70). The regional exception was the Estuary, where the CIL minimum temperature volume was similar to 2019 conditions (0.4 °C; +0.3 SD; Figure 69) and of slightly larger volume.

Beneath the cold intermediate water layer, the estuarine flow that carries deep water to the channel heads has carried the increasingly warm waters that had been transitioning through Cabot Strait, central Gulf and Esquiman Channel for the past several years further upstream. Consequently, deep temperatures in August have increased since 2019 below 150 m almost everywhere (Figure 69). Taking into consideration all the data recorded in different months of the year, the four regions along the deep Laurentian Channel, meaning the Estuary, northwestern Gulf, Central Gulf and Cabot Strait, are all experiencing record temperatures at 300 m (5.9°C, 6.3°C, 6.9°C, 7.2°C). The annual mean has thus far exceeded 7°C in Cabot Strait for the second consecutive year. The Gulf-wide average temperature at 300 m has reached a record level since 1915 of 6.75°C, an increase of 0.24°C since 2019 (Figure 70).

ACKNOWLEDGEMENTS

We would like to thank both crews of the CCGS *Teleost* and wish to highlight the excellent work of the 2020 scientific team. The science team consisted of Hugo Bourdages, Nicolas Coulombe, Laurie Isabel, Jean-François Lussier, Marie-Claude Marquis, Jordan Ouellette-Plante, Eric Parent, Pierre-Marc Scallon-Chouinard et Caroline Senay. We also thank Denis Bernier for his support for the development of data entry tools and data management.

Finally, we would like to thank Charley Cyr for reviewing this document.

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FIGURES

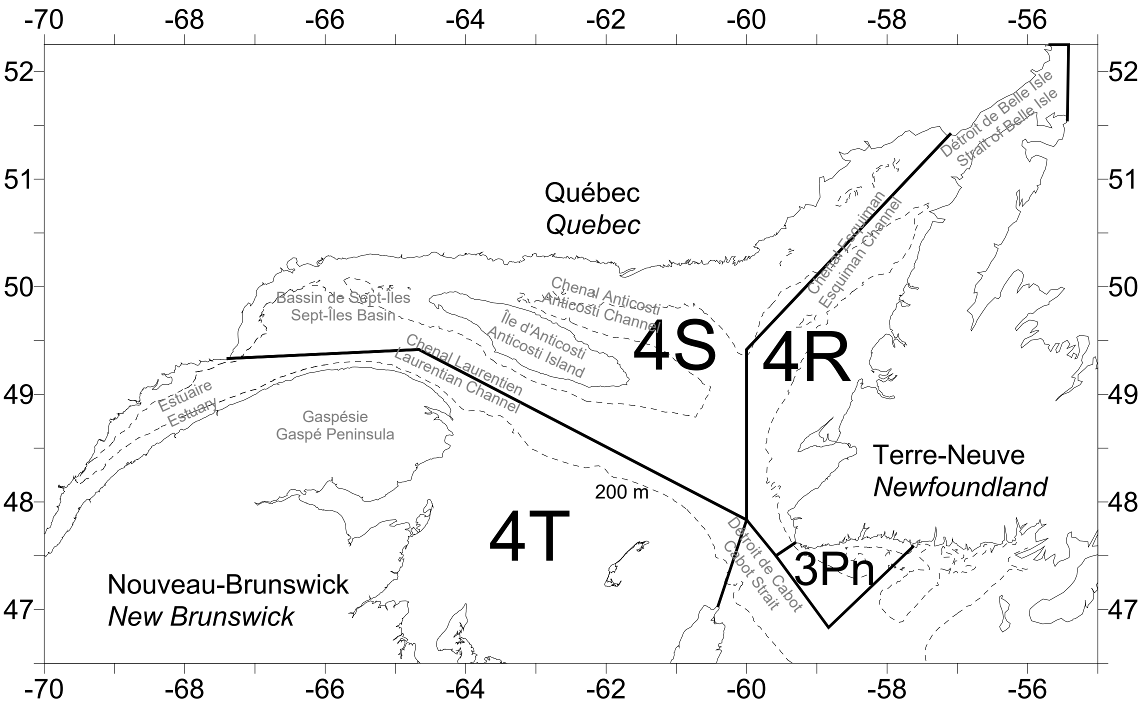


Figure 1. NAFO Divisions of the Estuary and Gulf of St. Lawrence and names of locations mentioned in the text.

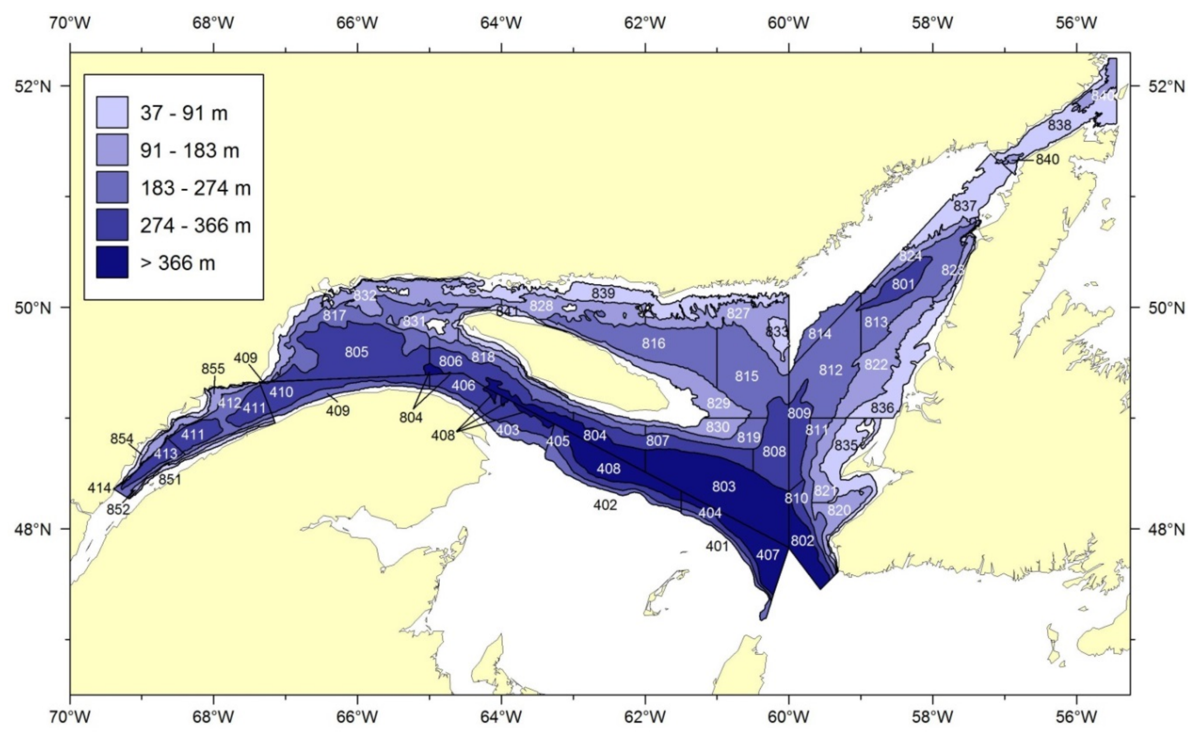


Figure 2. Stratification scheme used for the groundfish and shrimp research survey in the Estuary and northern Gulf of St. Lawrence.

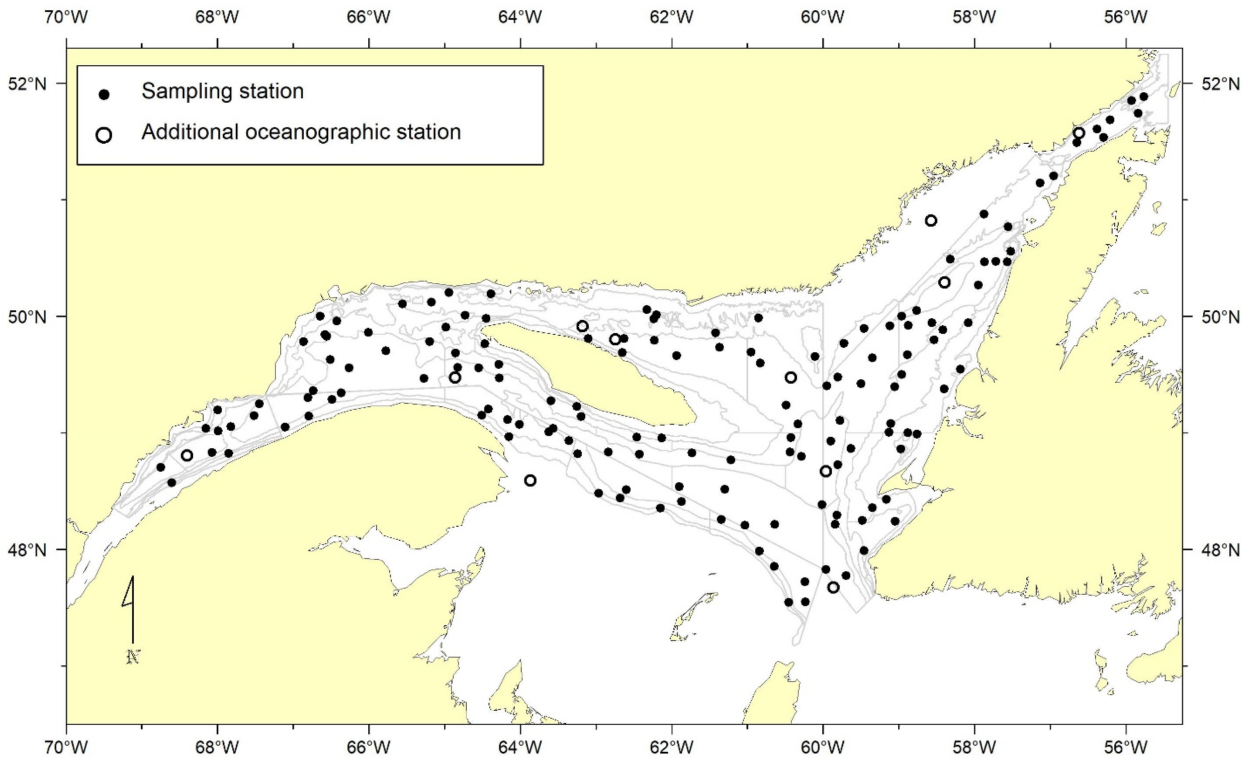


Figure 3. Locations of successful sampling stations (trawl and oceanography) and additional oceanographic stations for the 2020 survey.

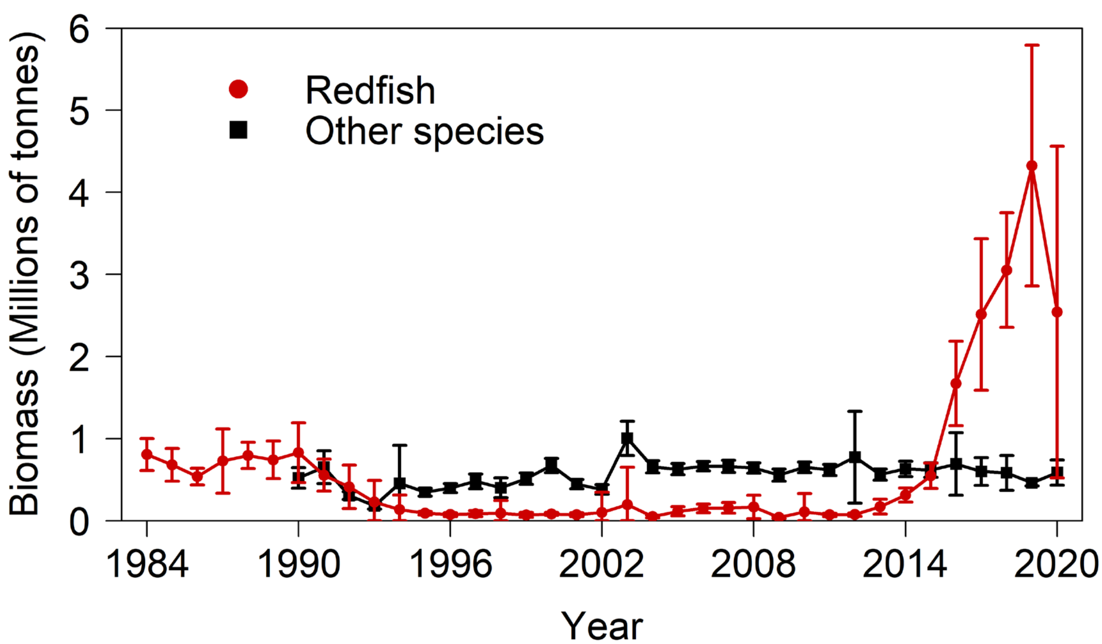


Figure 4. Biomass (1 000 000 of tons) of redfish spp. and all other species sampled in 4RST survey. Error bars represent 95% confidence intervals.

Black dogfish

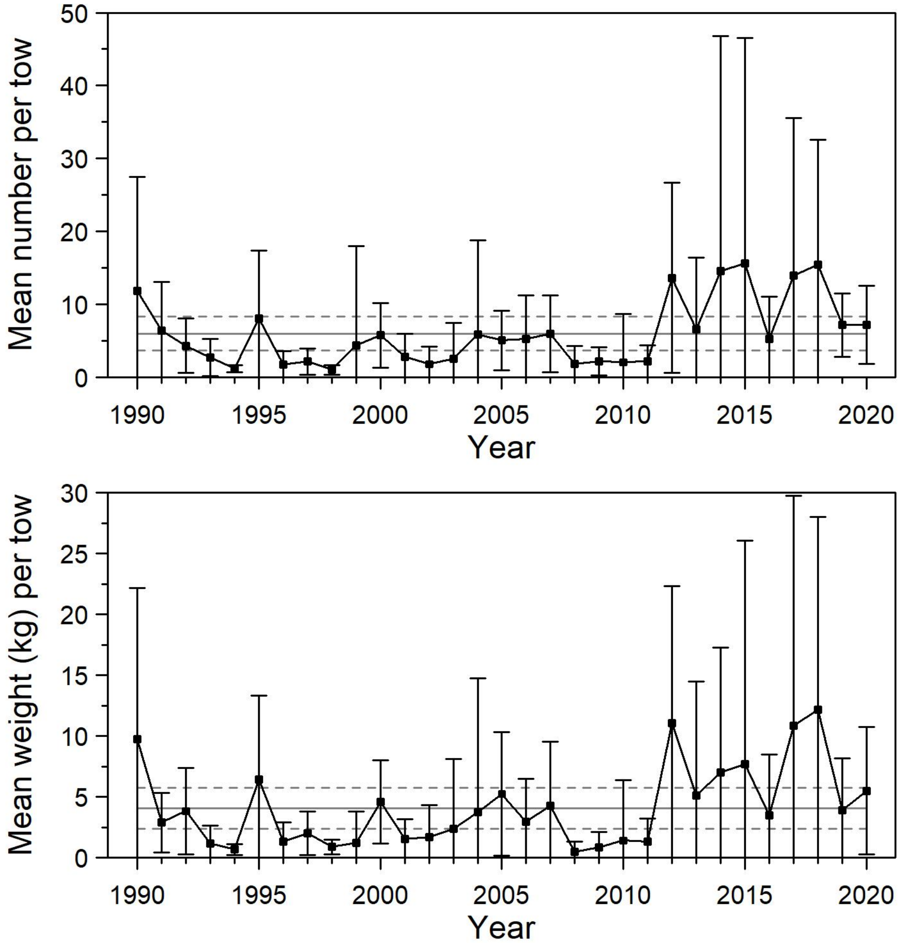


Figure 5. Mean numbers and mean weights per 15 minutes tow observed during the survey for black dogfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

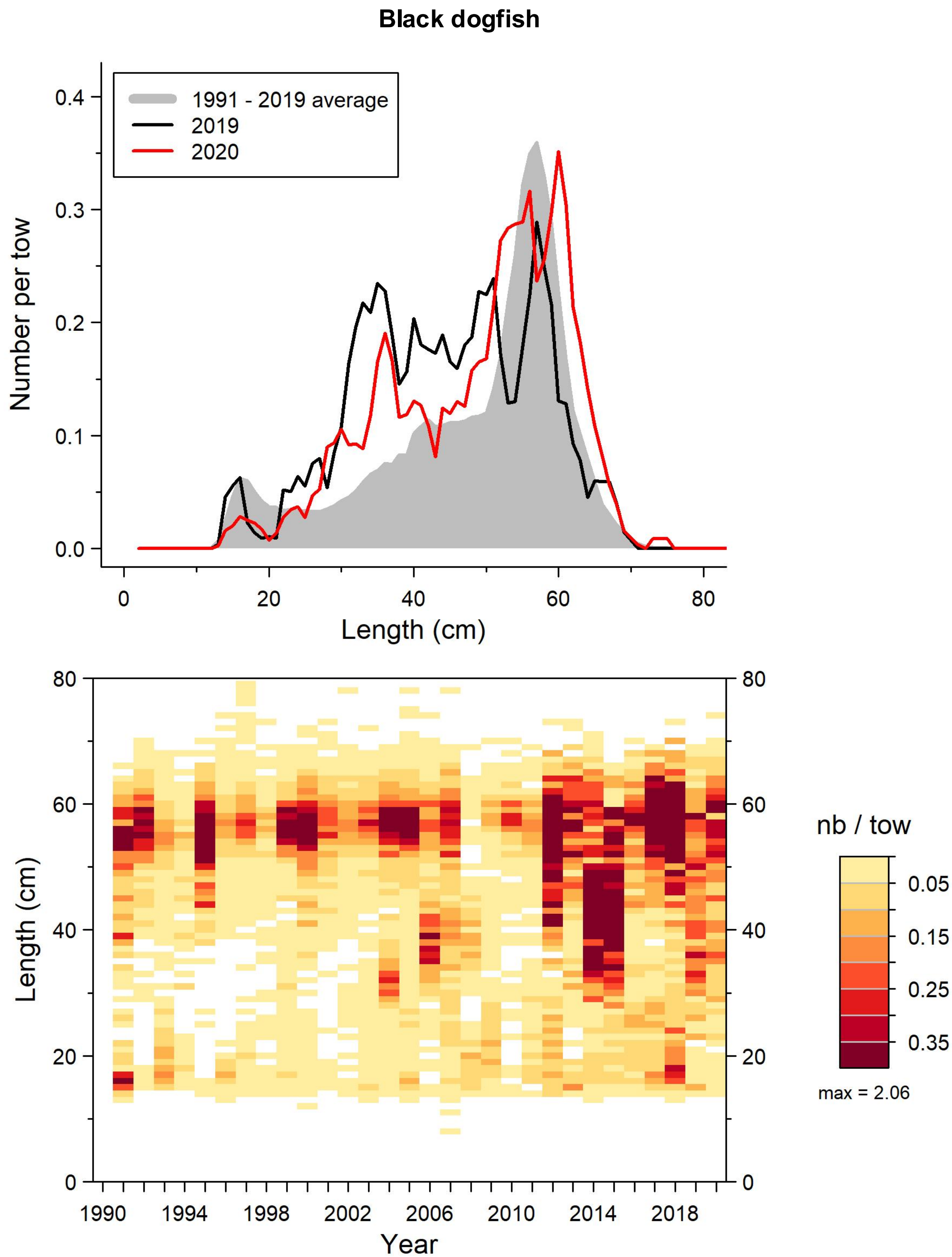


Figure 6. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for black dogfish in 4RST.

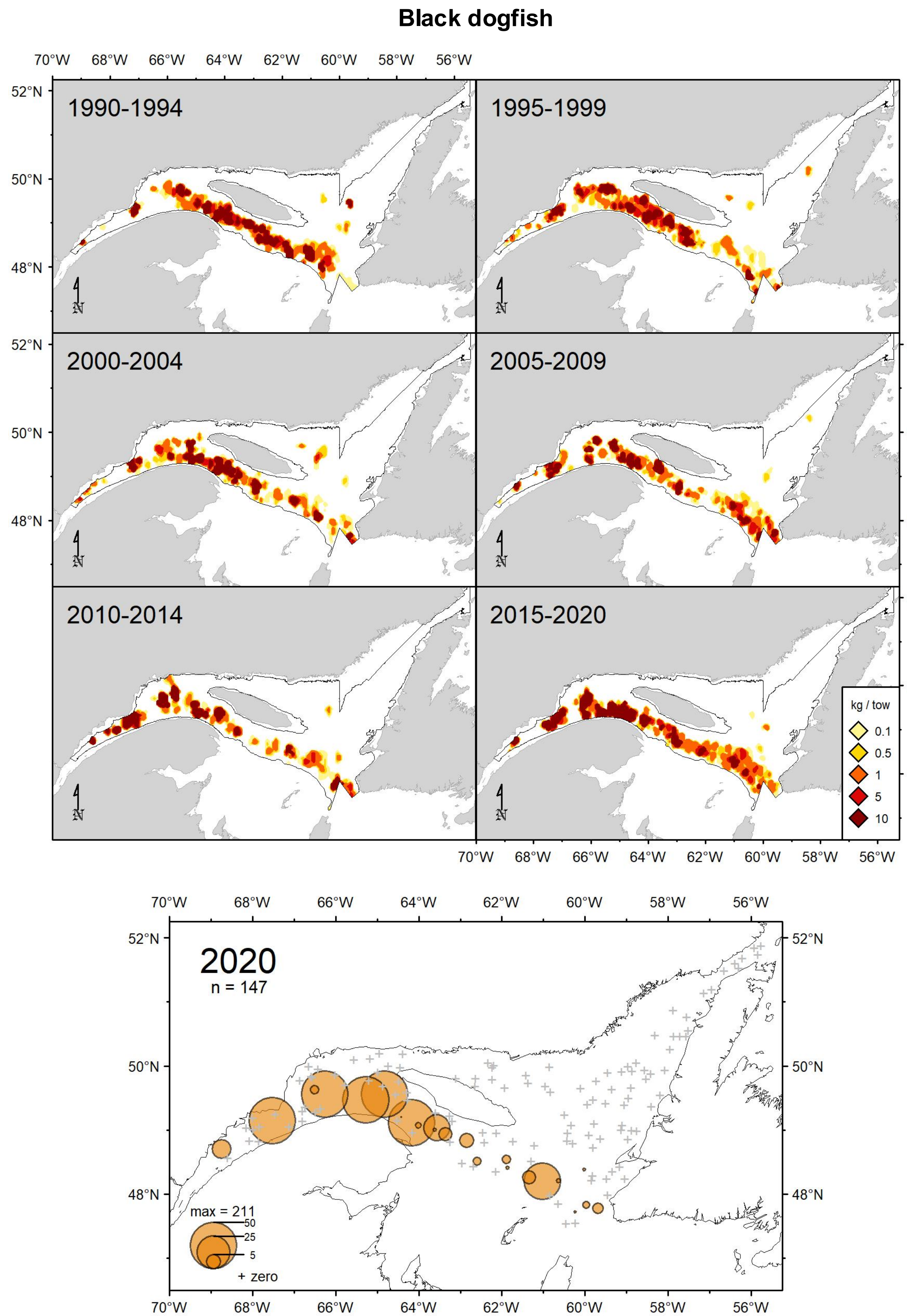


Figure 7. Black dogfish catch rates (kg/15 minutes tow) distribution.

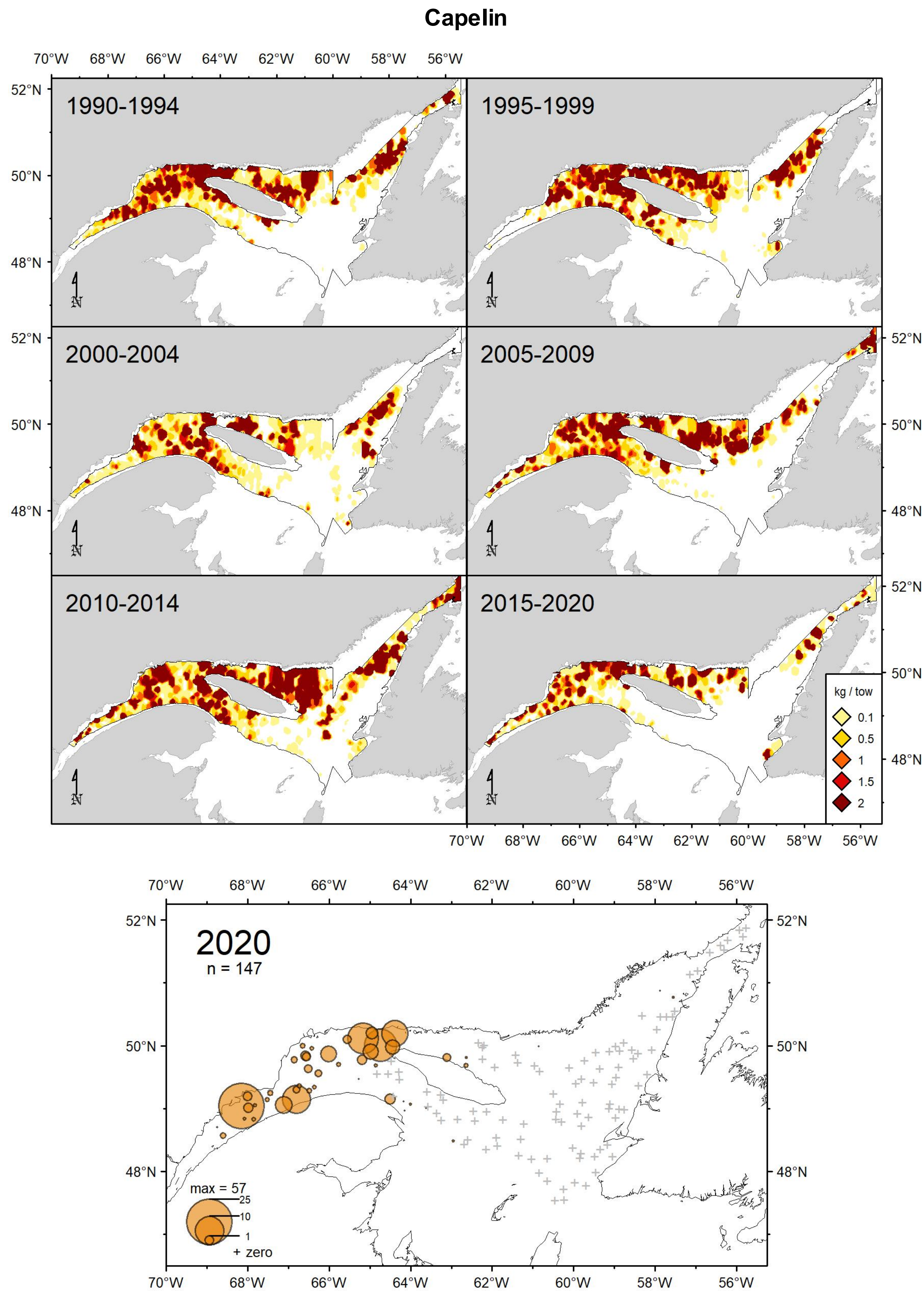


Figure 8. Capelin catch rates (kg/15 minutes tow) distribution.

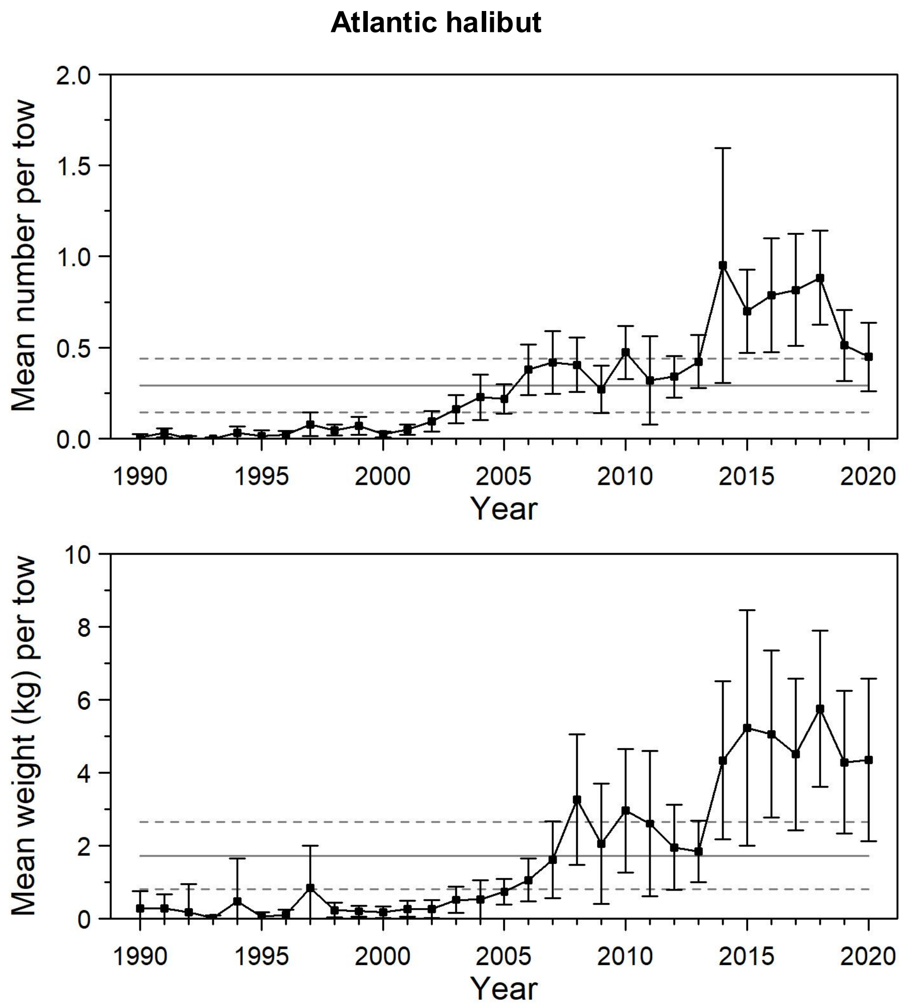


Figure 9. Mean numbers and mean weights per 15 minutes tow observed during the survey for Atlantic halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

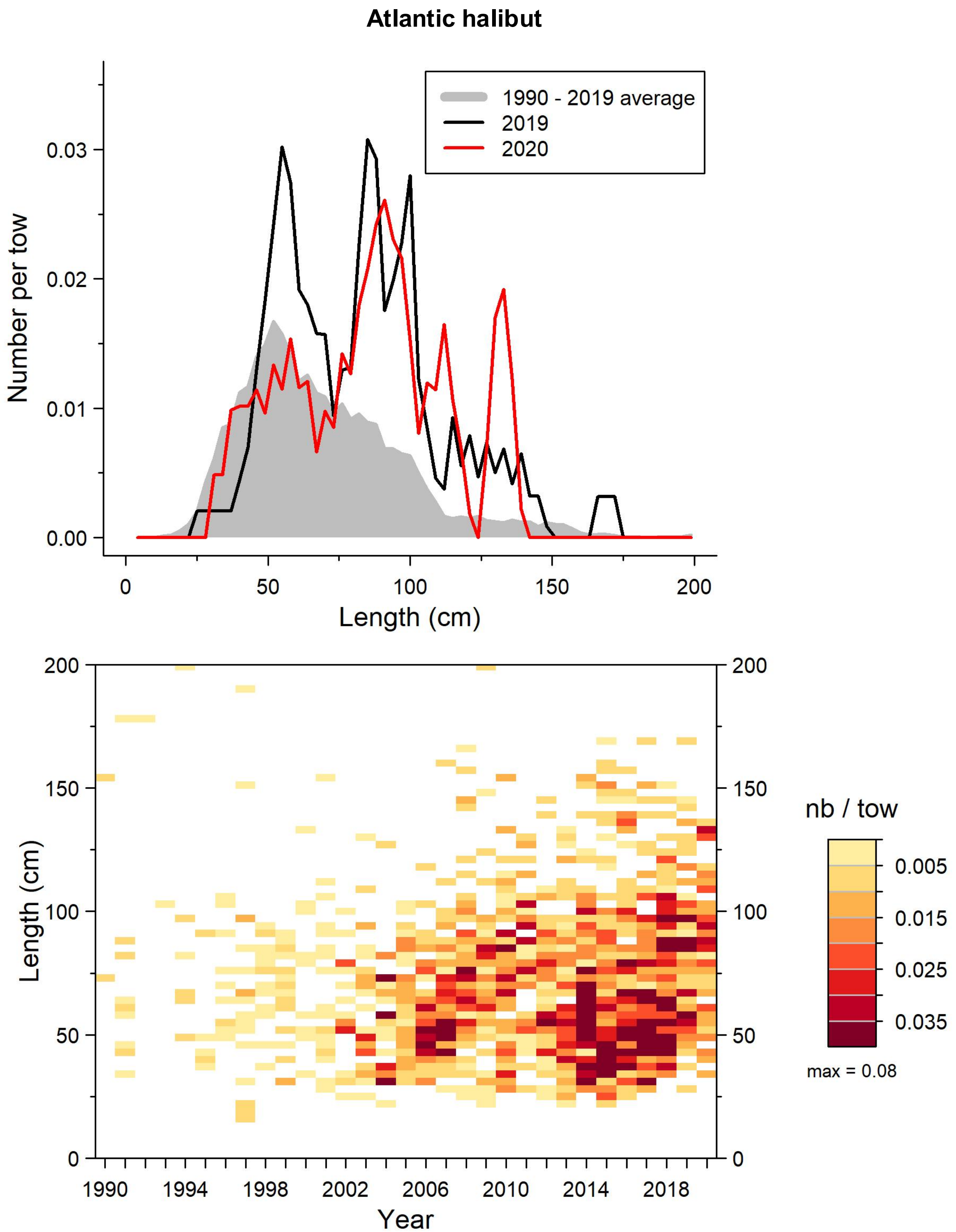


Figure 10. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Atlantic halibut in 4RST.

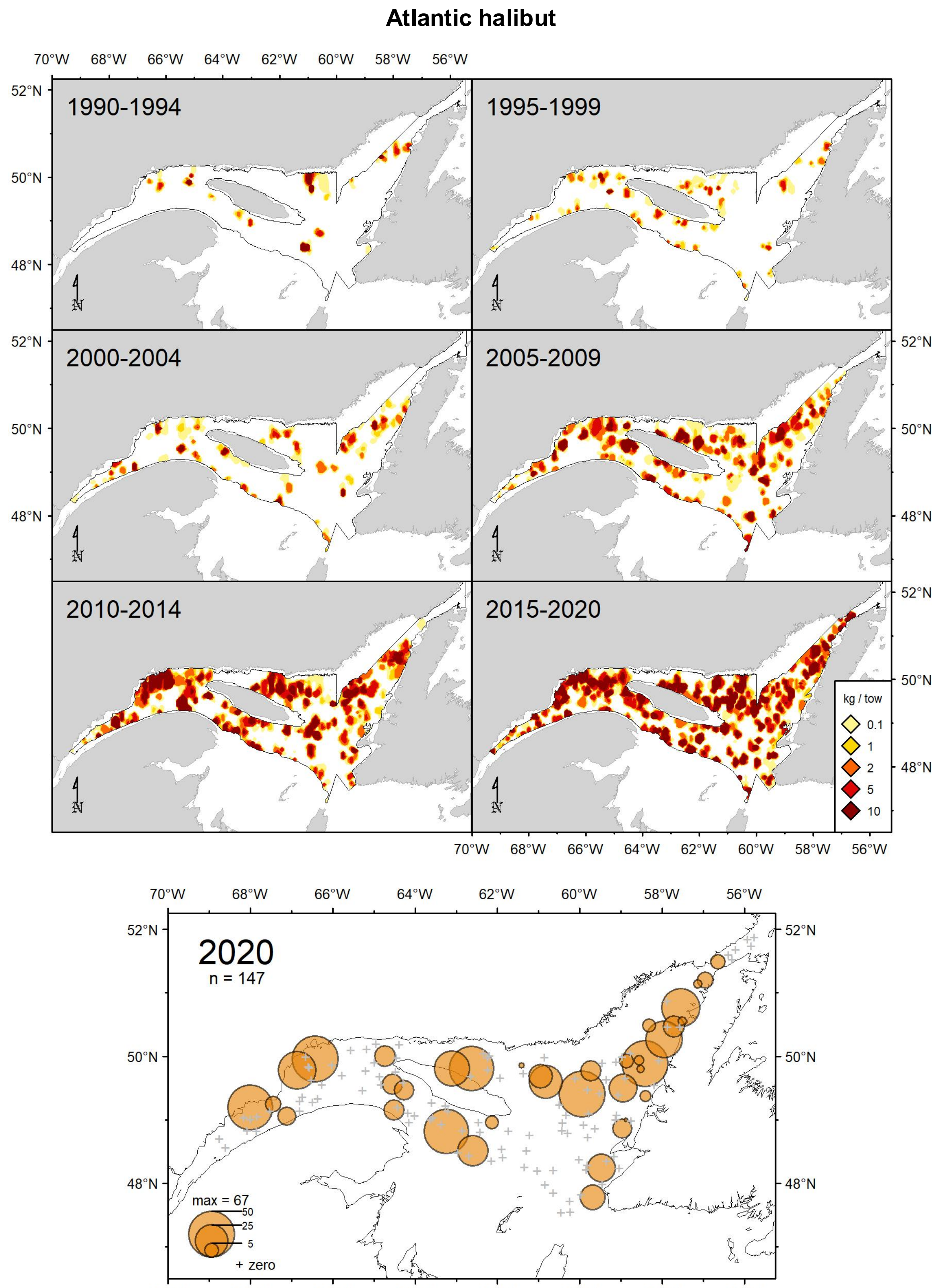


Figure 11. Atlantic halibut catch rates (kg/15 minutes tow) distribution.

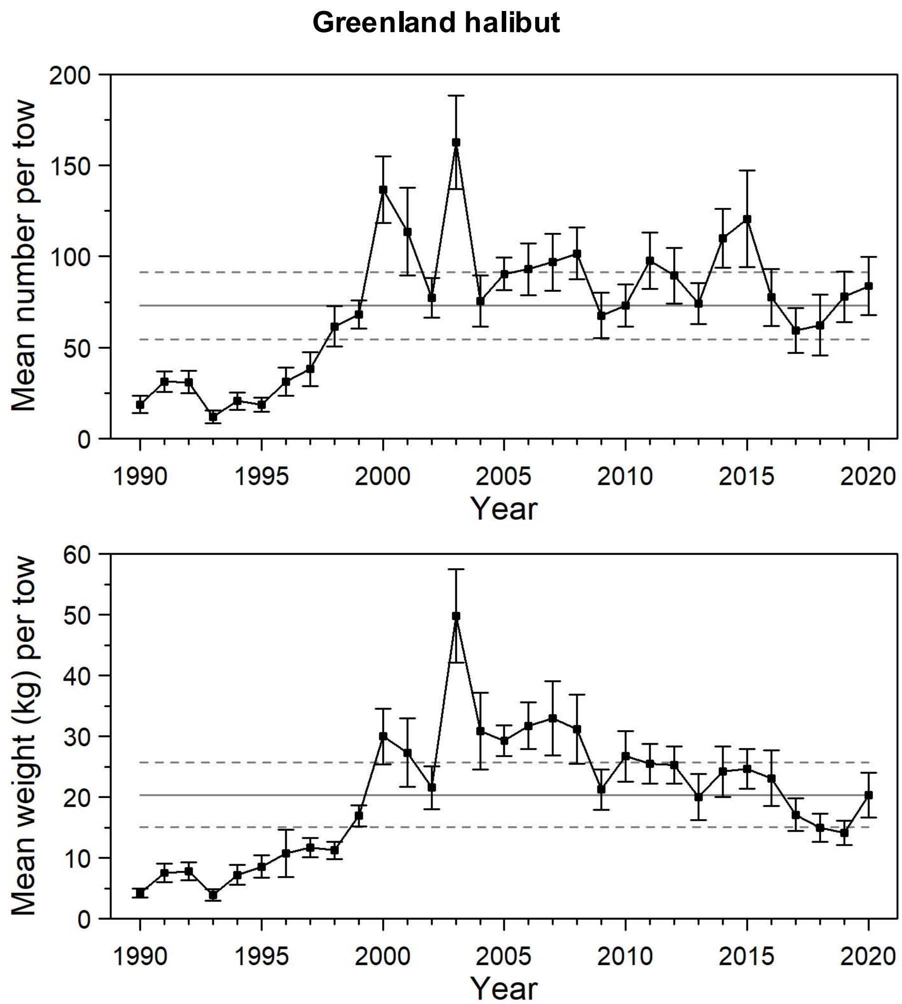


Figure 12. Mean numbers and mean weights per 15 minutes tow observed during the survey for Greenland halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

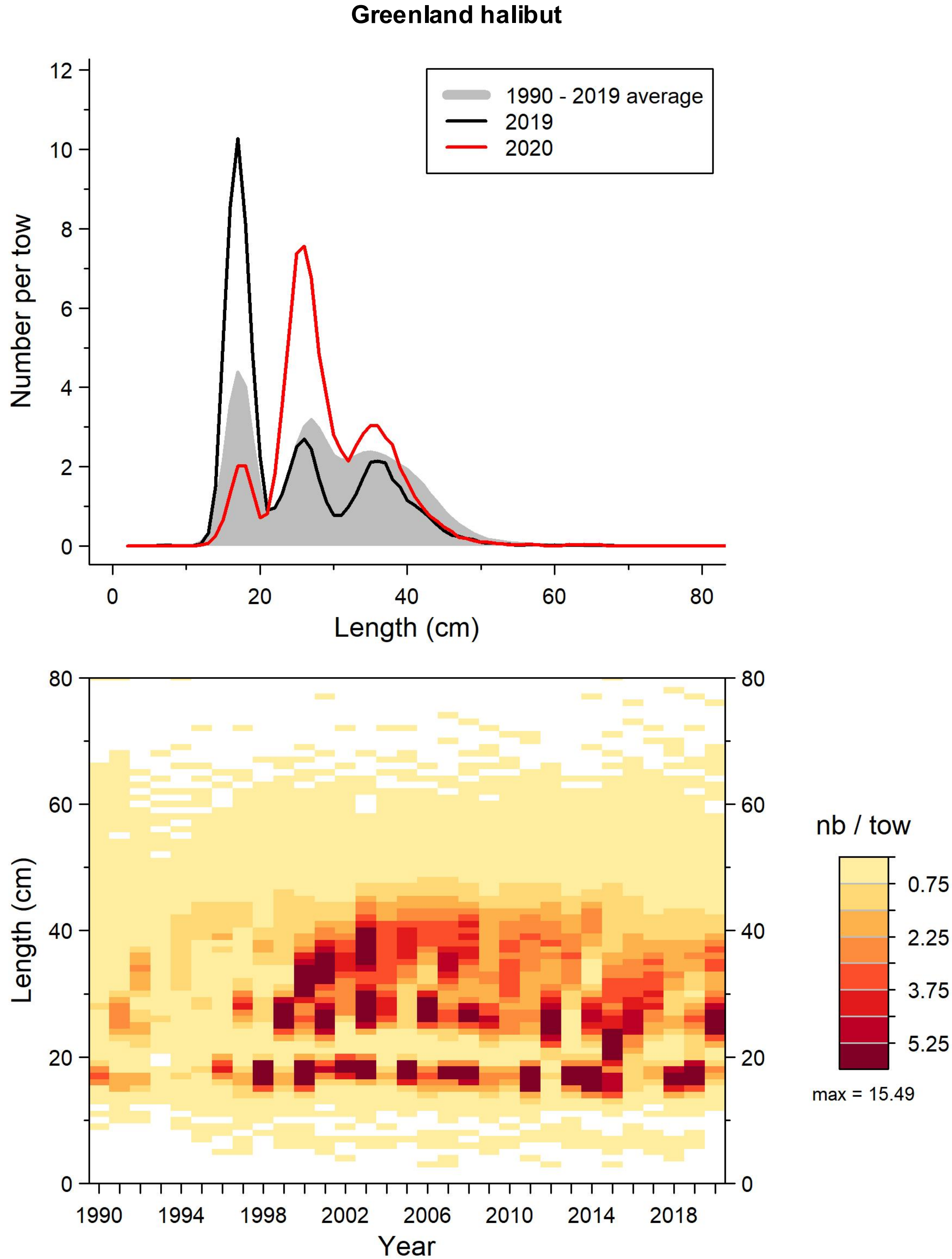


Figure 13. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Greenland halibut in 4RST.

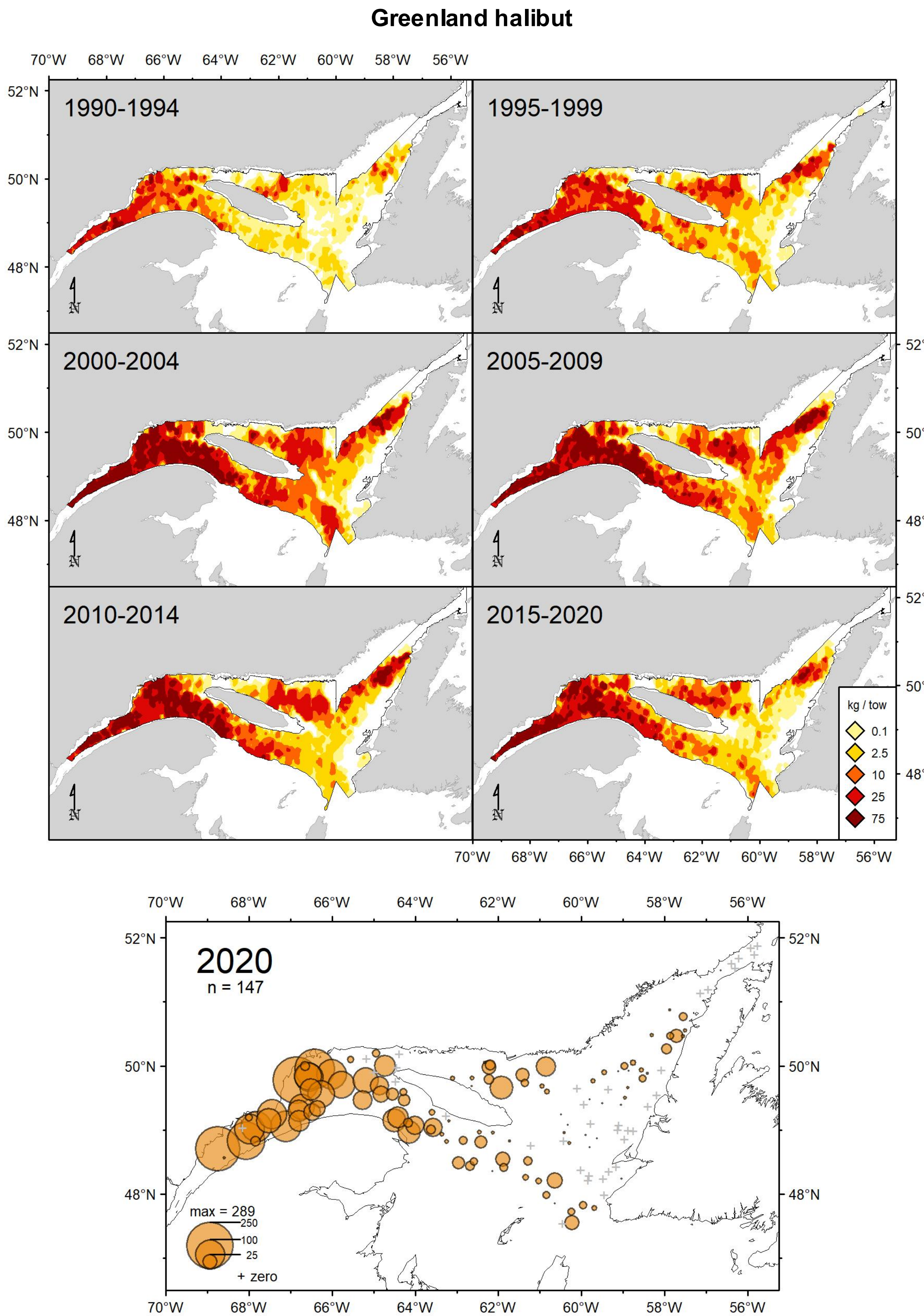


Figure 14. Greenland halibut catch rates (kg/15 minutes tow) distribution.

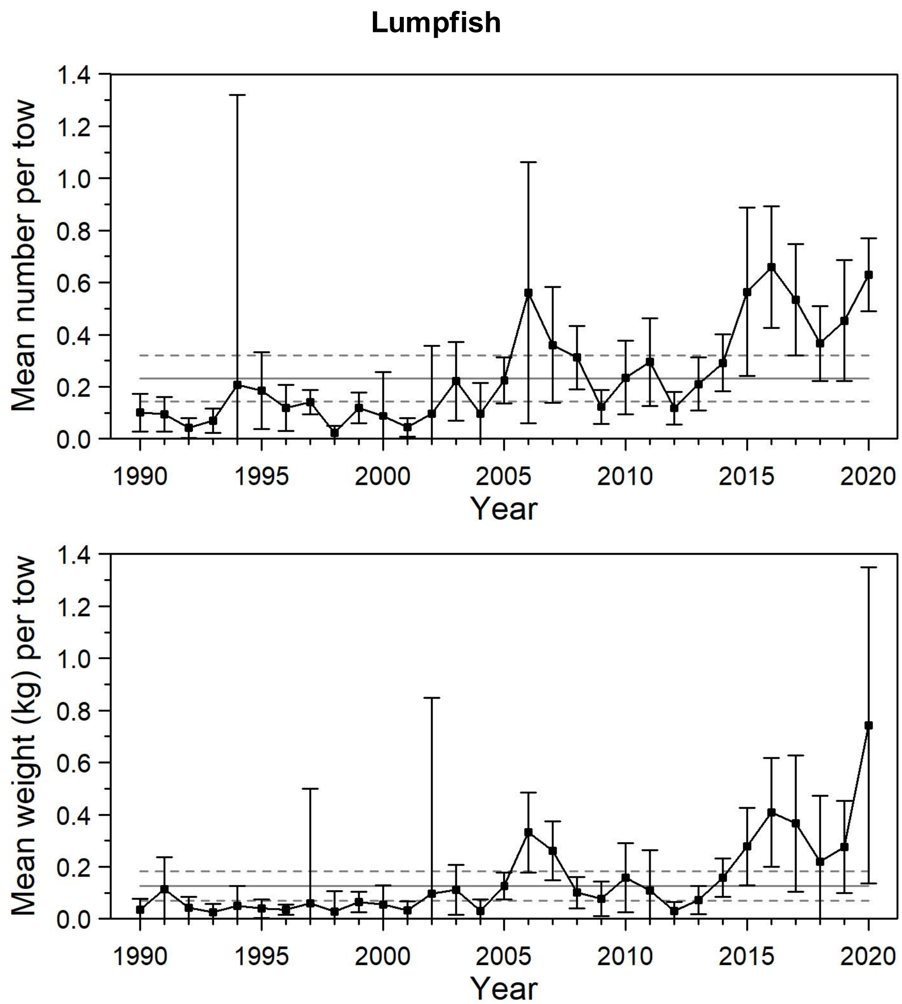


Figure 15. Mean numbers and mean weights per 15 minutes tow observed during the survey for lumpfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

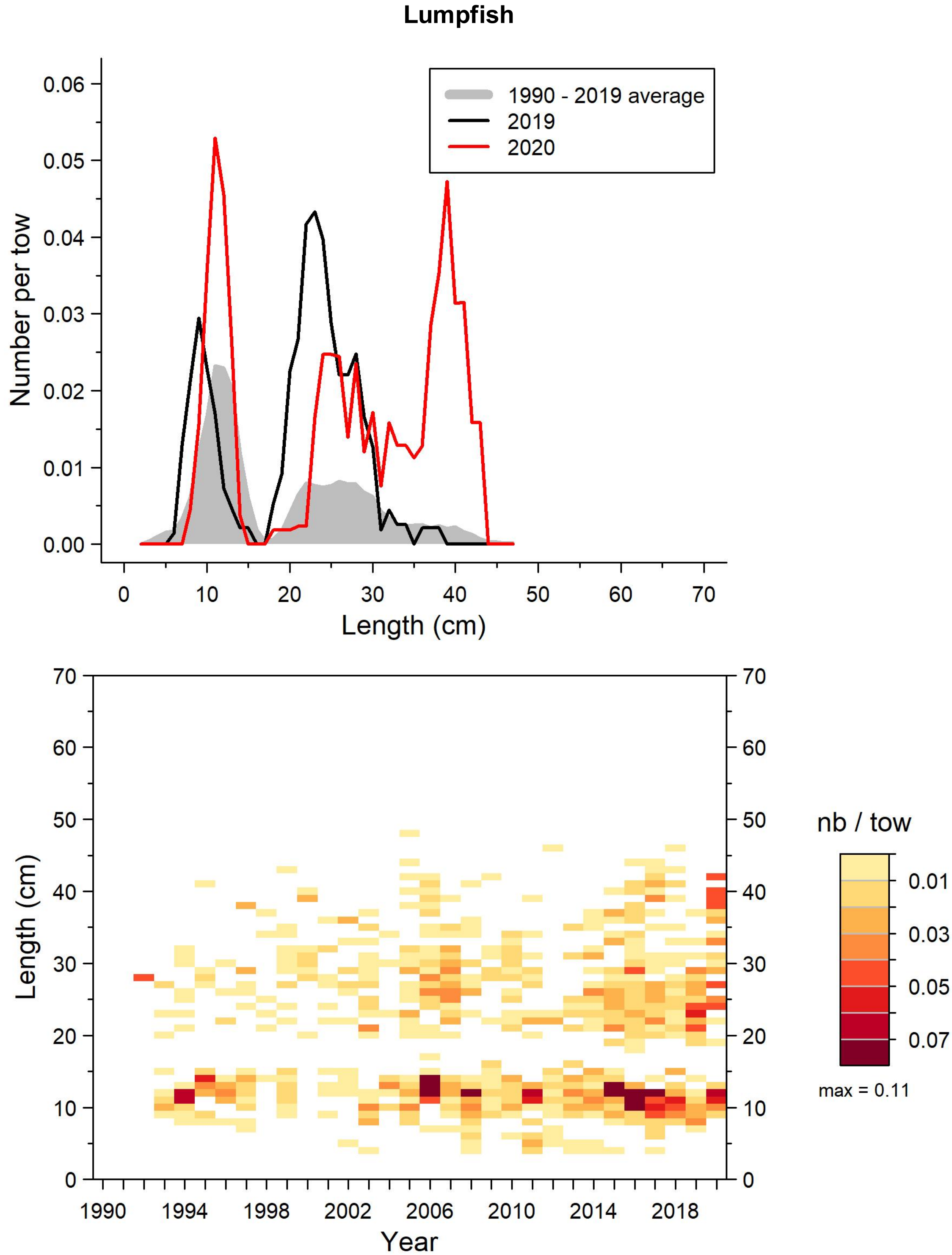
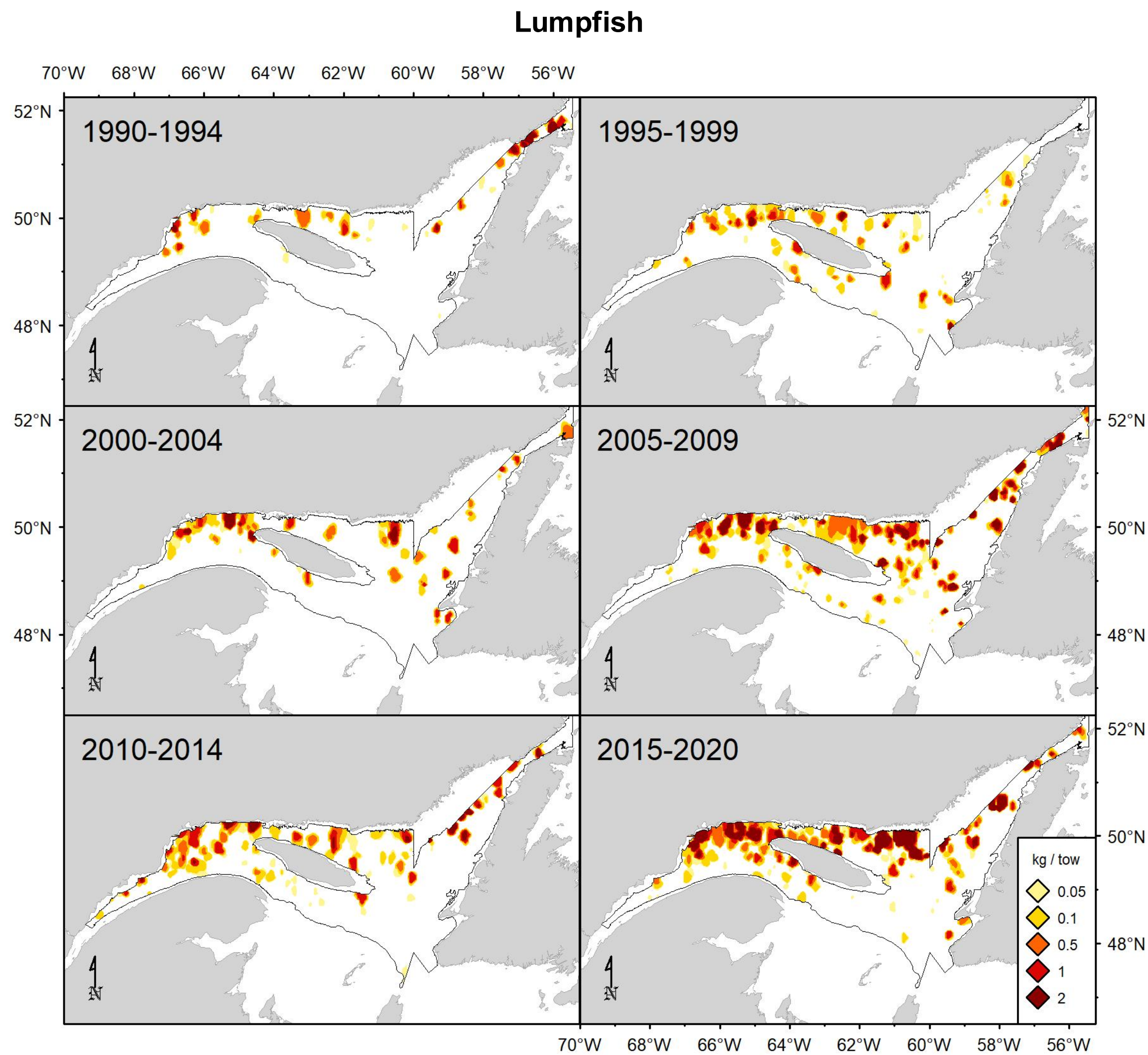


Figure 16. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for lumpfish in 4RST.



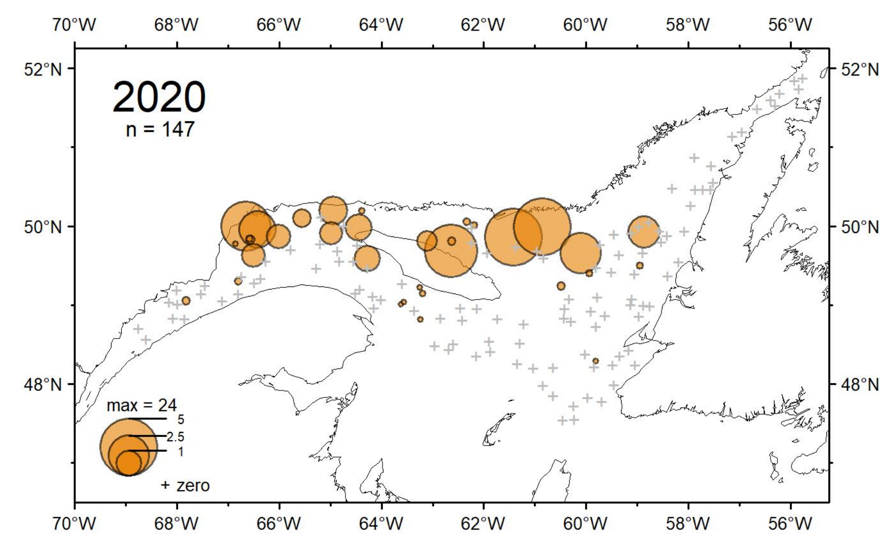


Figure 17. Lumpfish catch rates (kg/15 minutes tow) distribution.

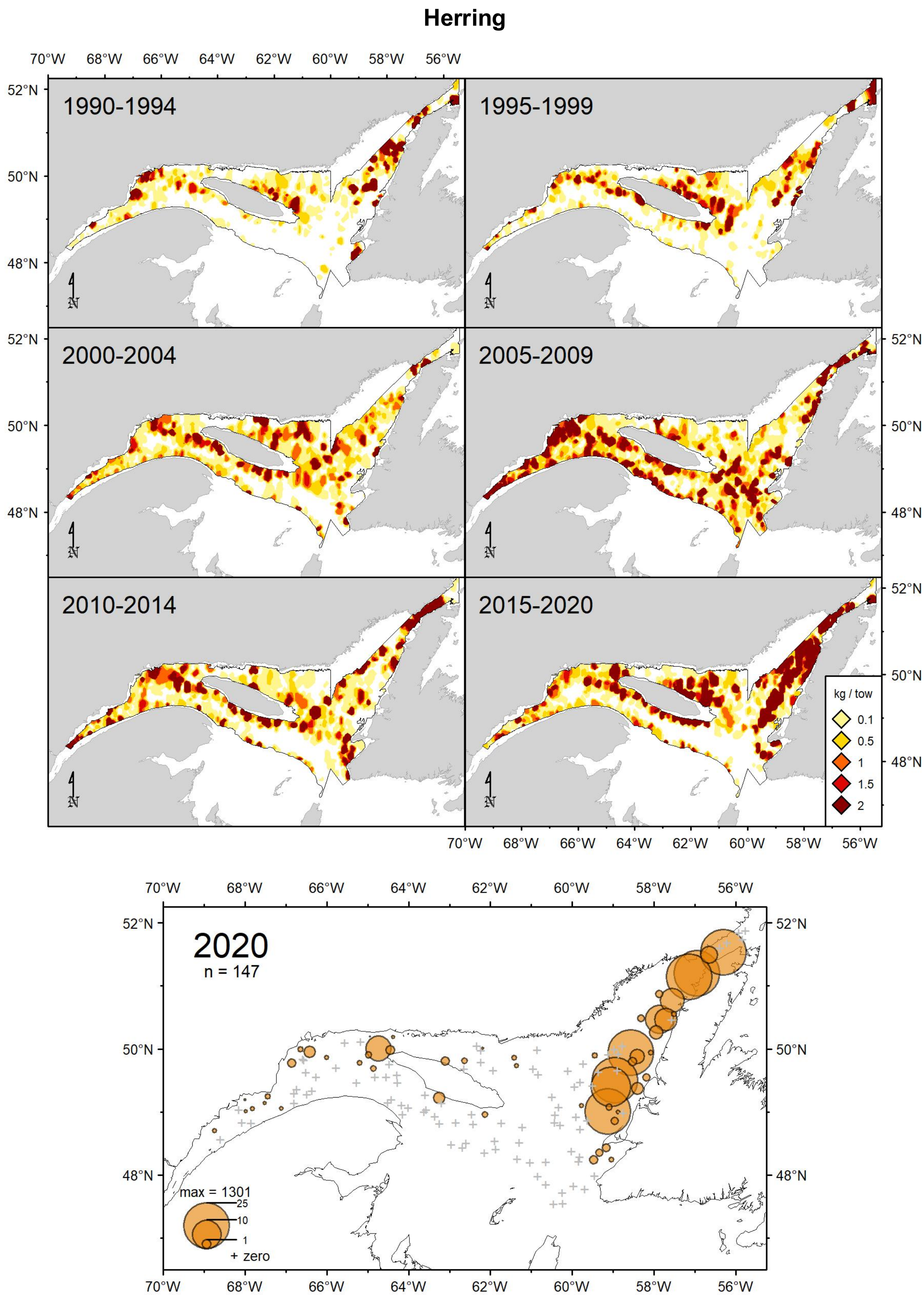


Figure 18. Herring catch rates (kg/15 minutes tow) distribution.

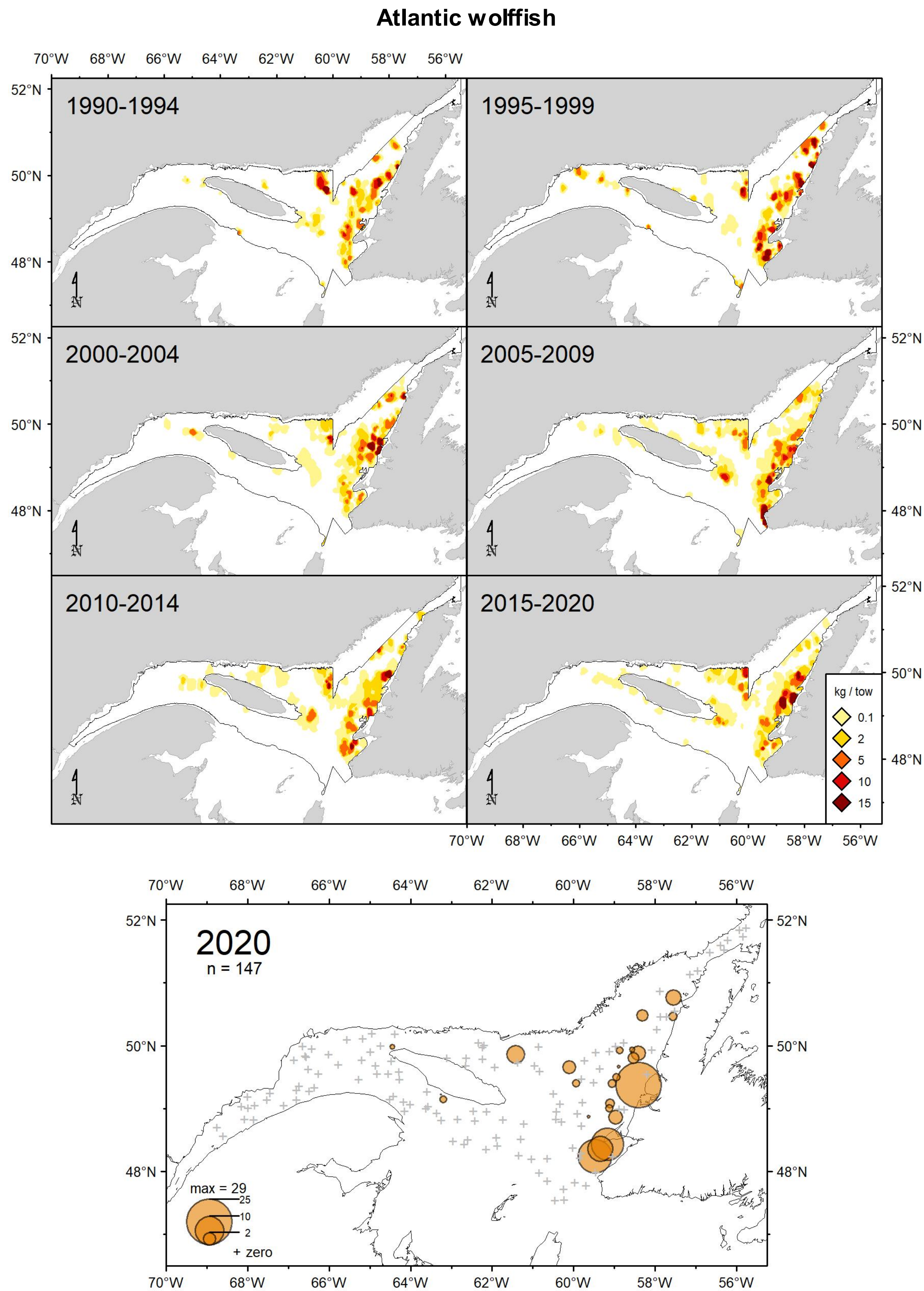
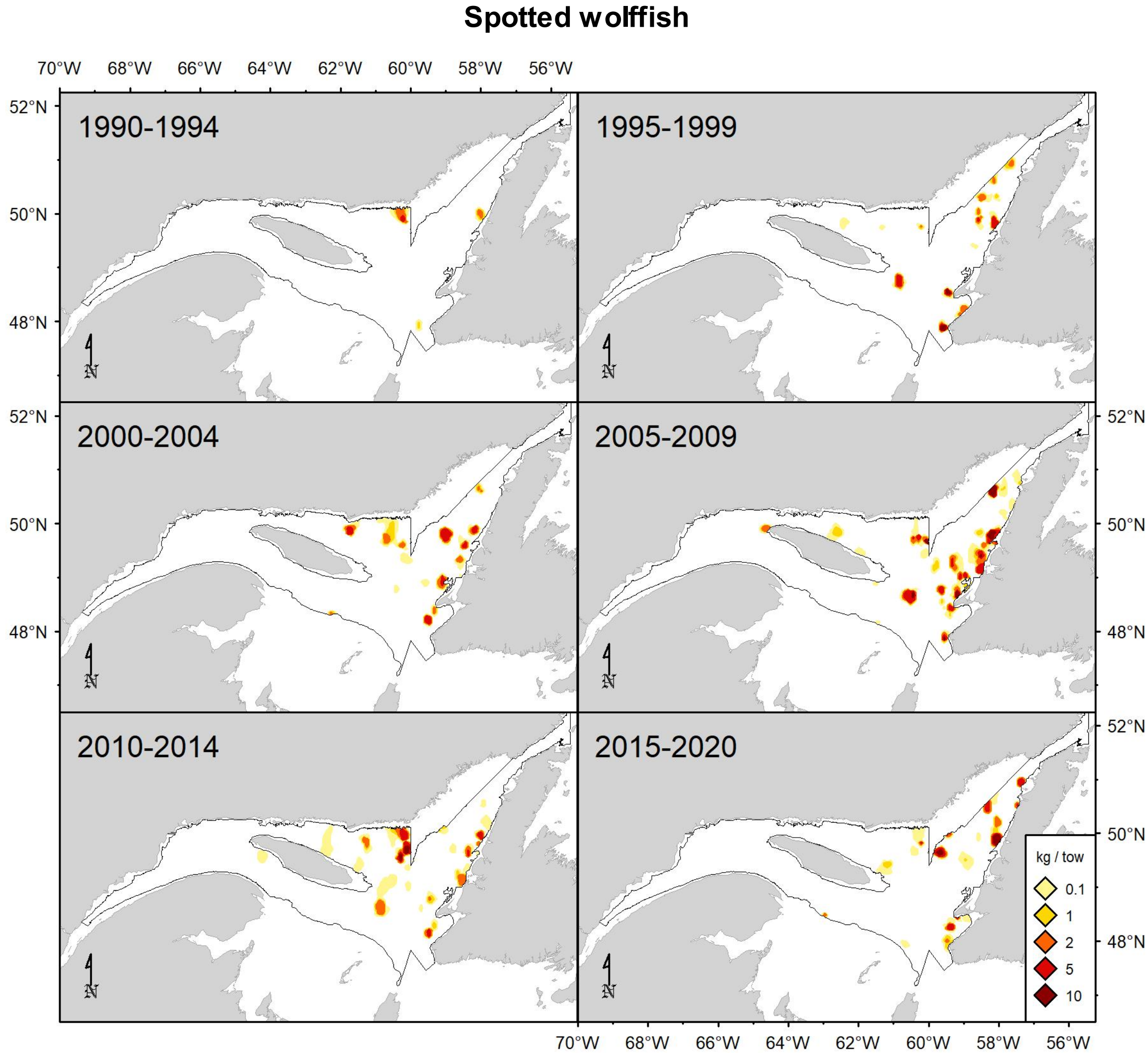


Figure 19. Atlantic wolffish catch rates (kg/15 minutes tow) distribution.



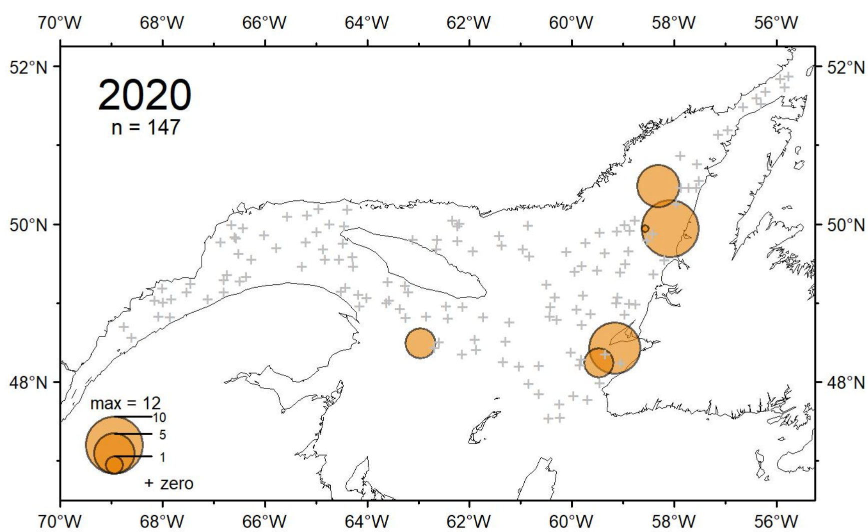


Figure 20. Spotted wolffish catch rates (kg/15 minutes tow) distribution.

Silver hake

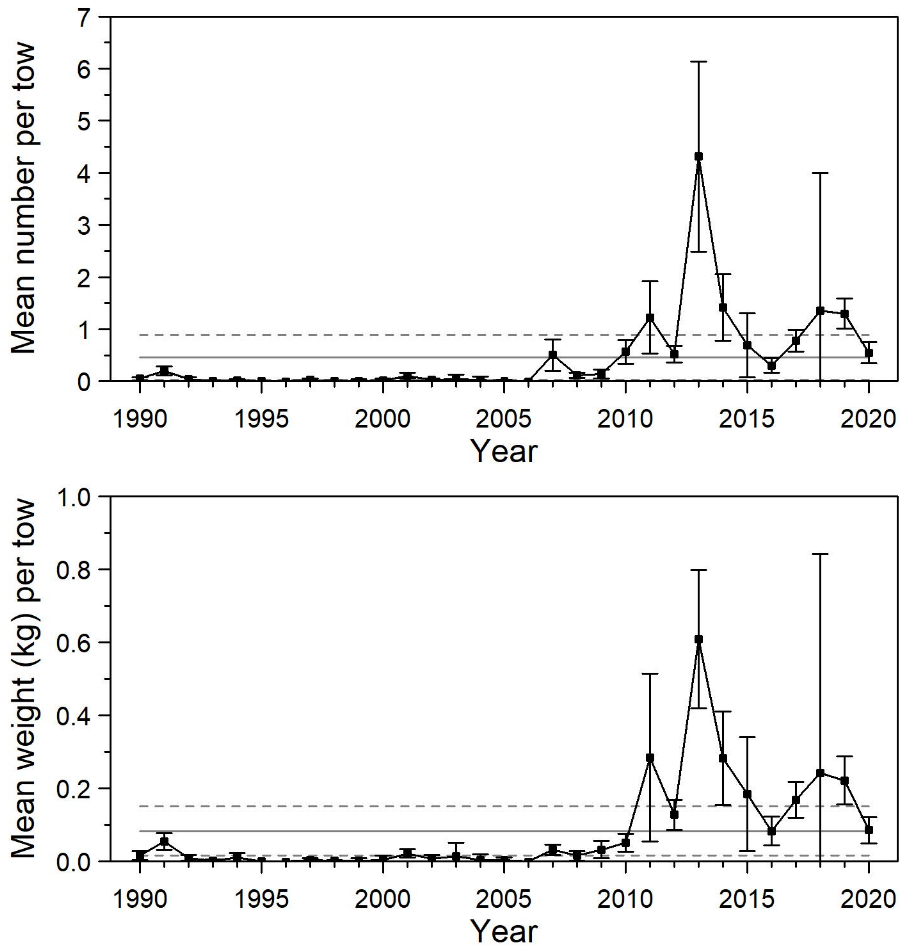


Figure 21. Mean numbers and mean weights per 15 minutes tow observed during the survey for silver hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

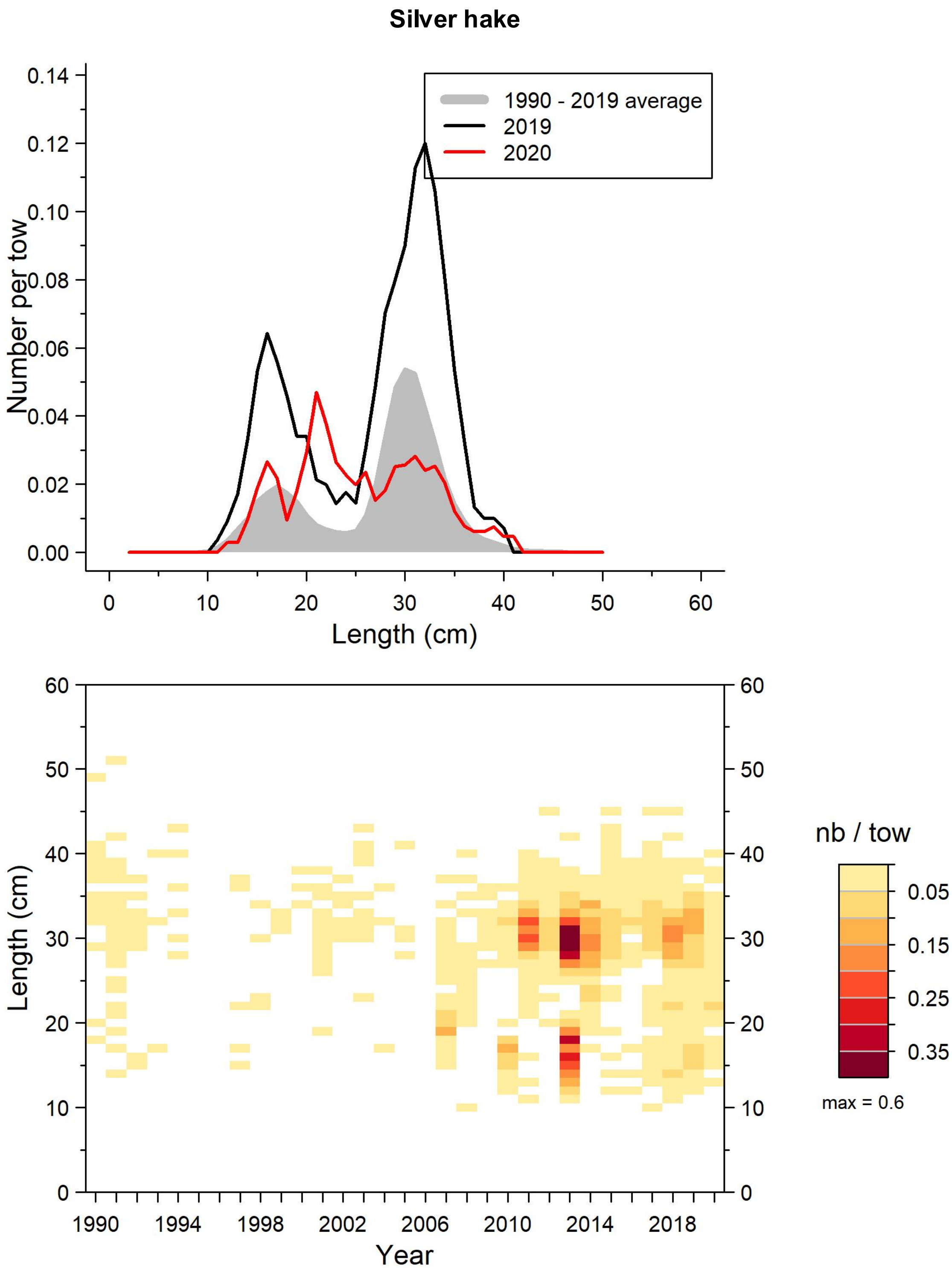


Figure 22. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for silver hake in 4RST.

Silver hake

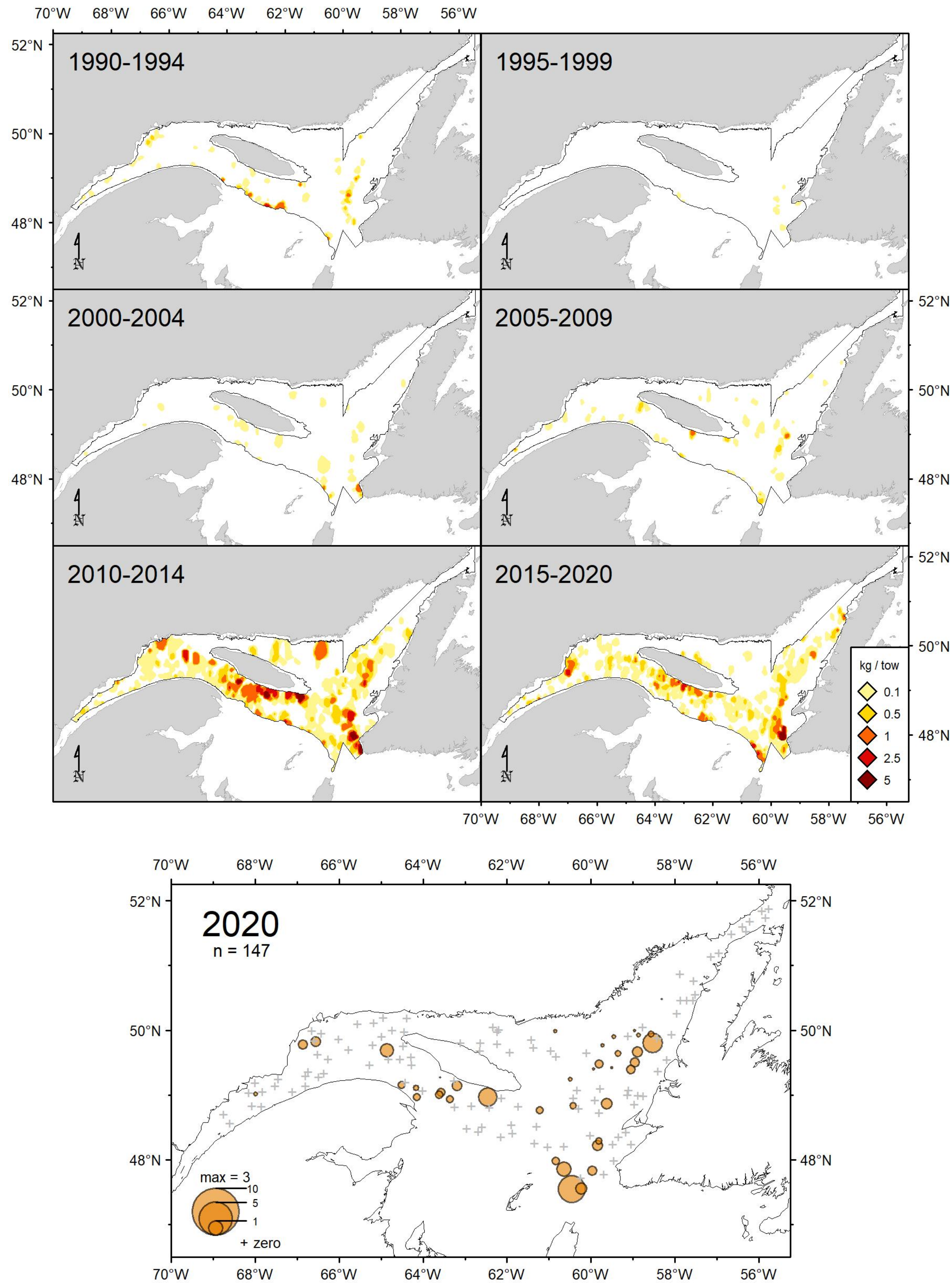


Figure 23. Silver hake catch rates (kg/15 minutes tow) distribution.

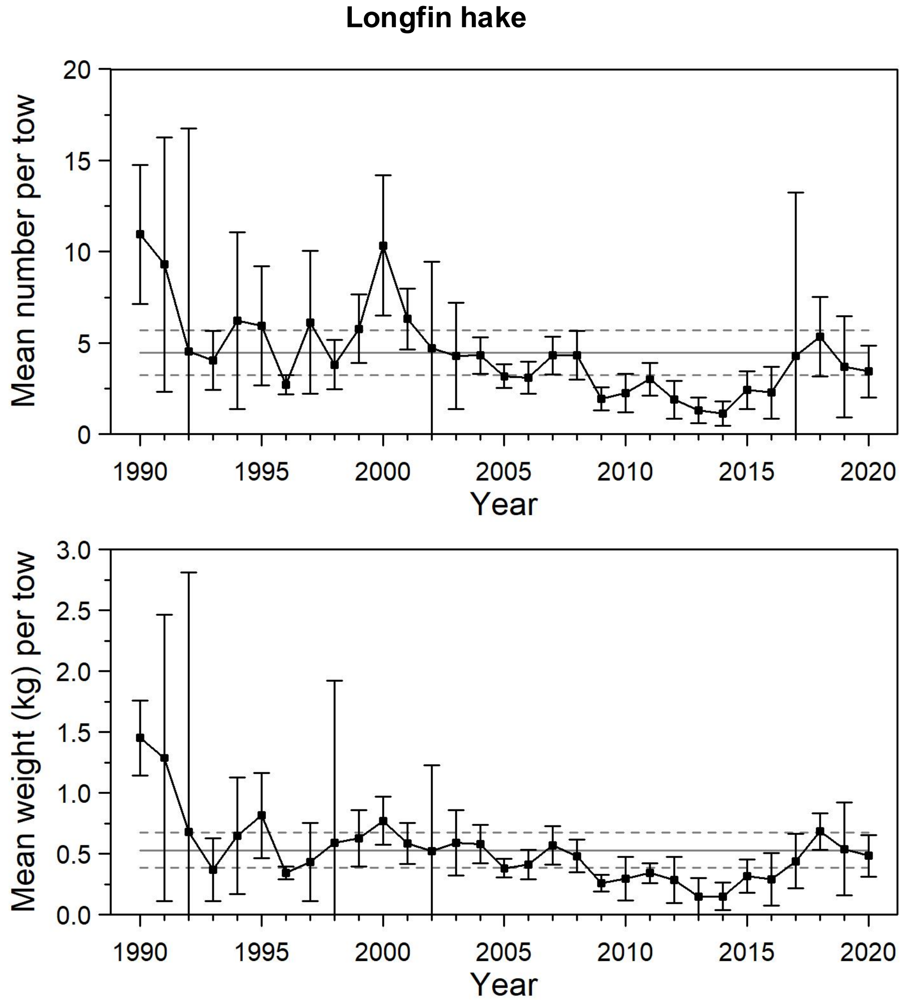


Figure 24. Mean numbers and mean weights per 15 minutes tow observed during the survey for longfin hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

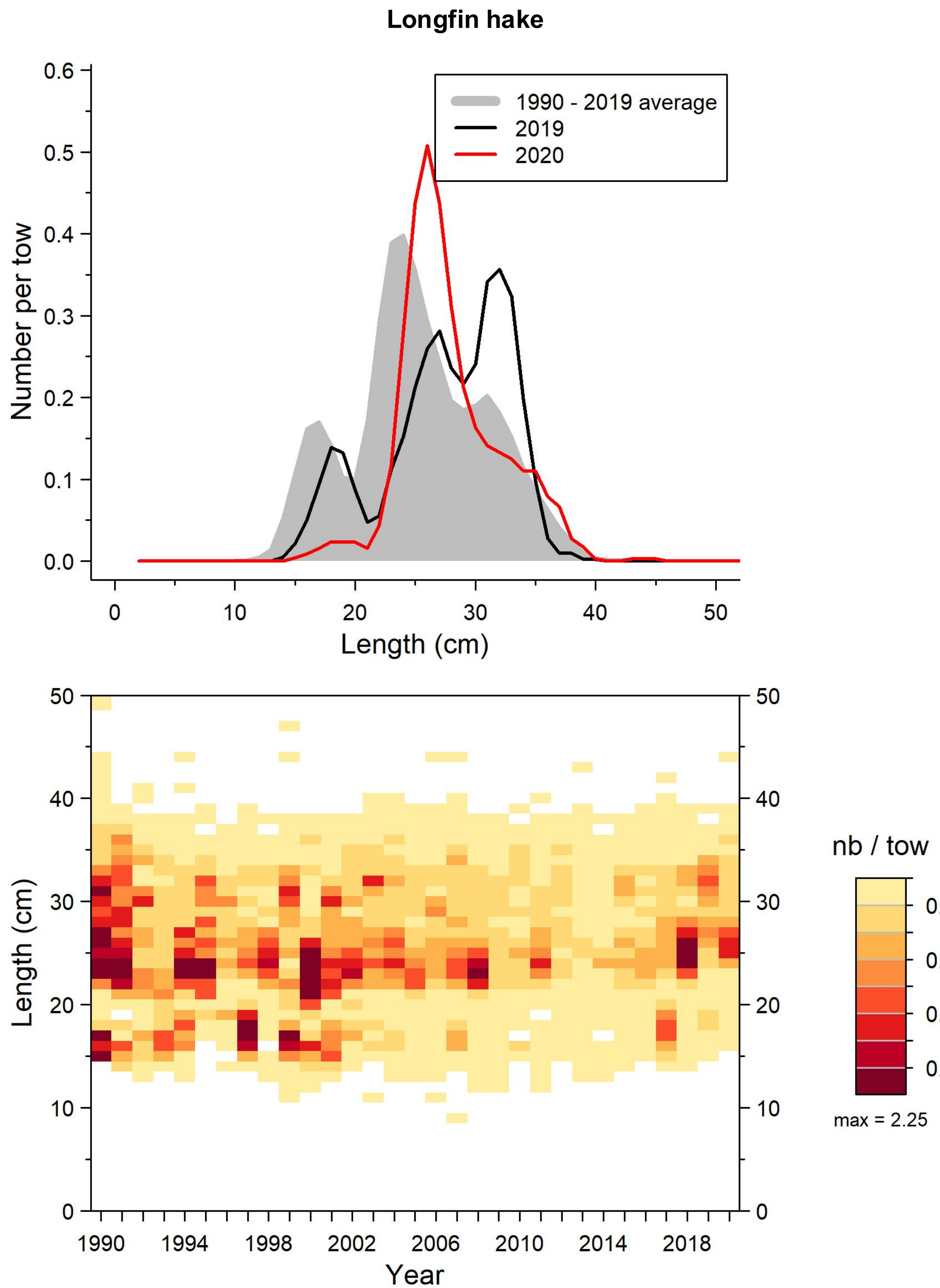
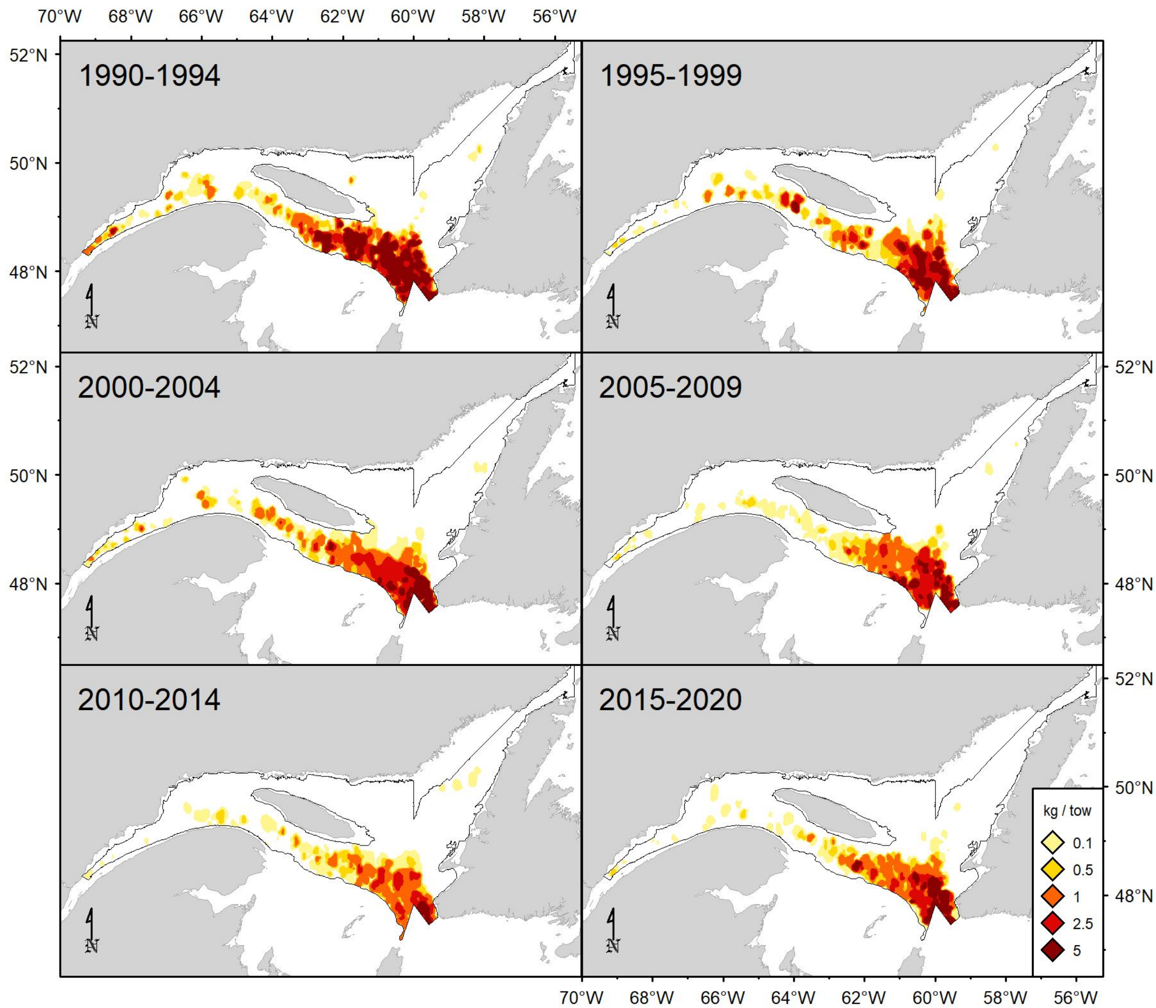


Figure 25. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for longfin hake in 4RST.

Longfin hake



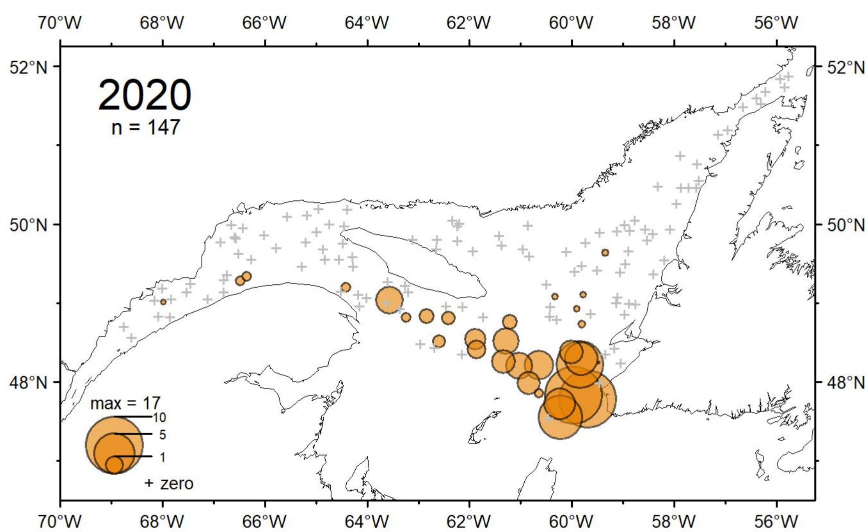


Figure 26. Longfin hake catch rates (kg/15 minutes tow) distribution.

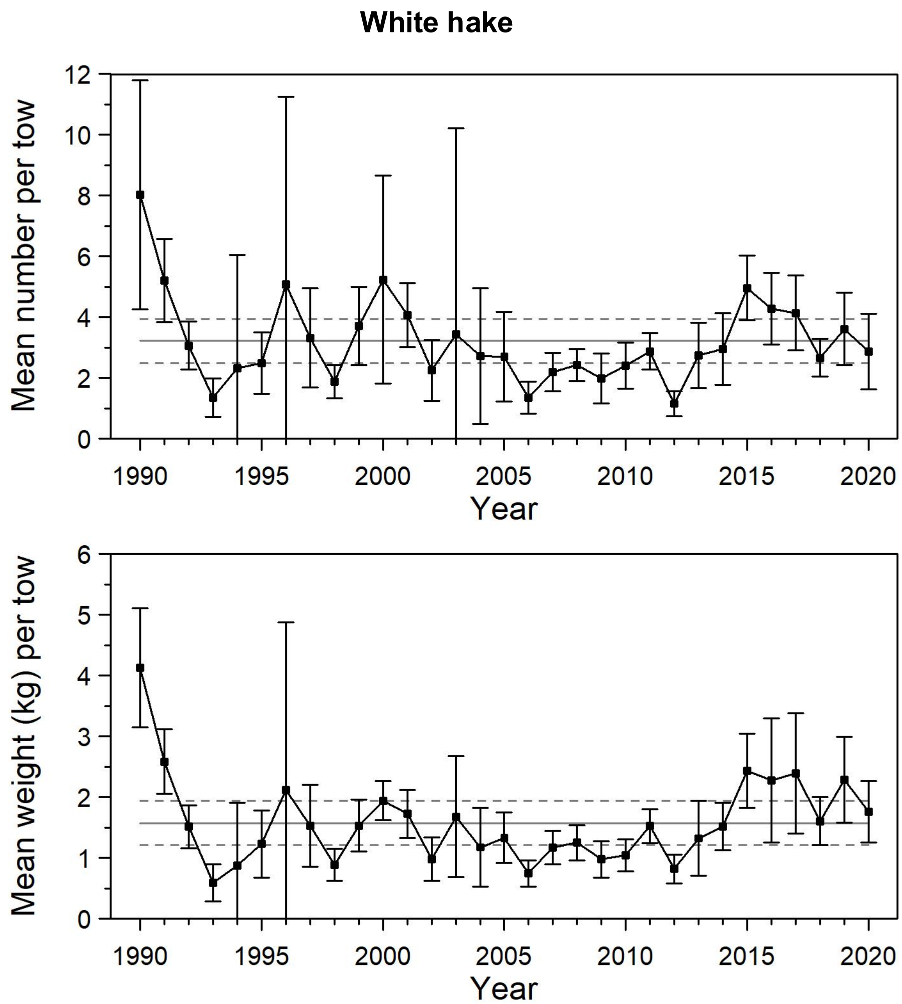


Figure 27. Mean numbers and mean weights per 15 minutes tow observed during the survey for white hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

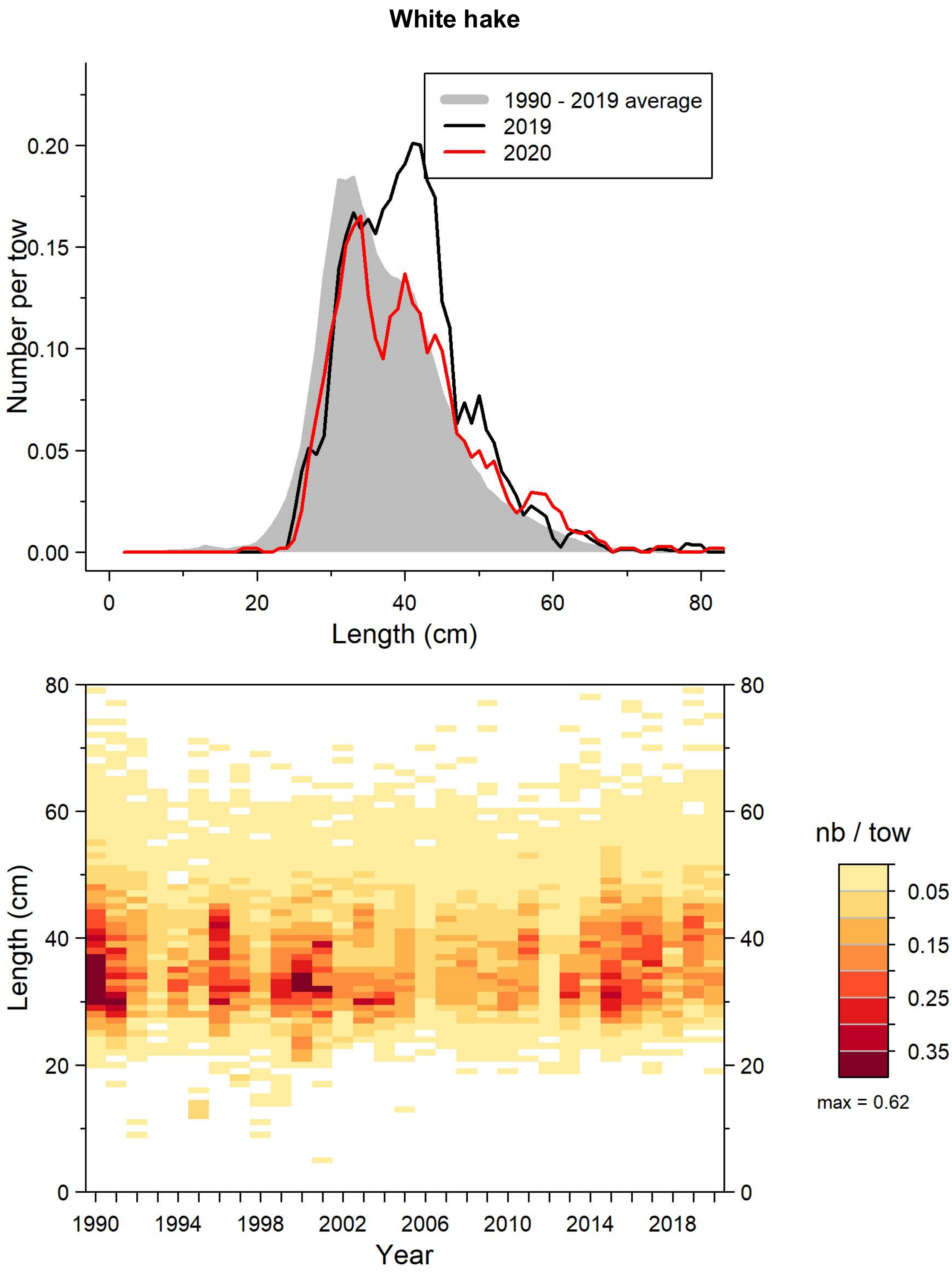


Figure 28. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for white hake in 4RST.

White hake

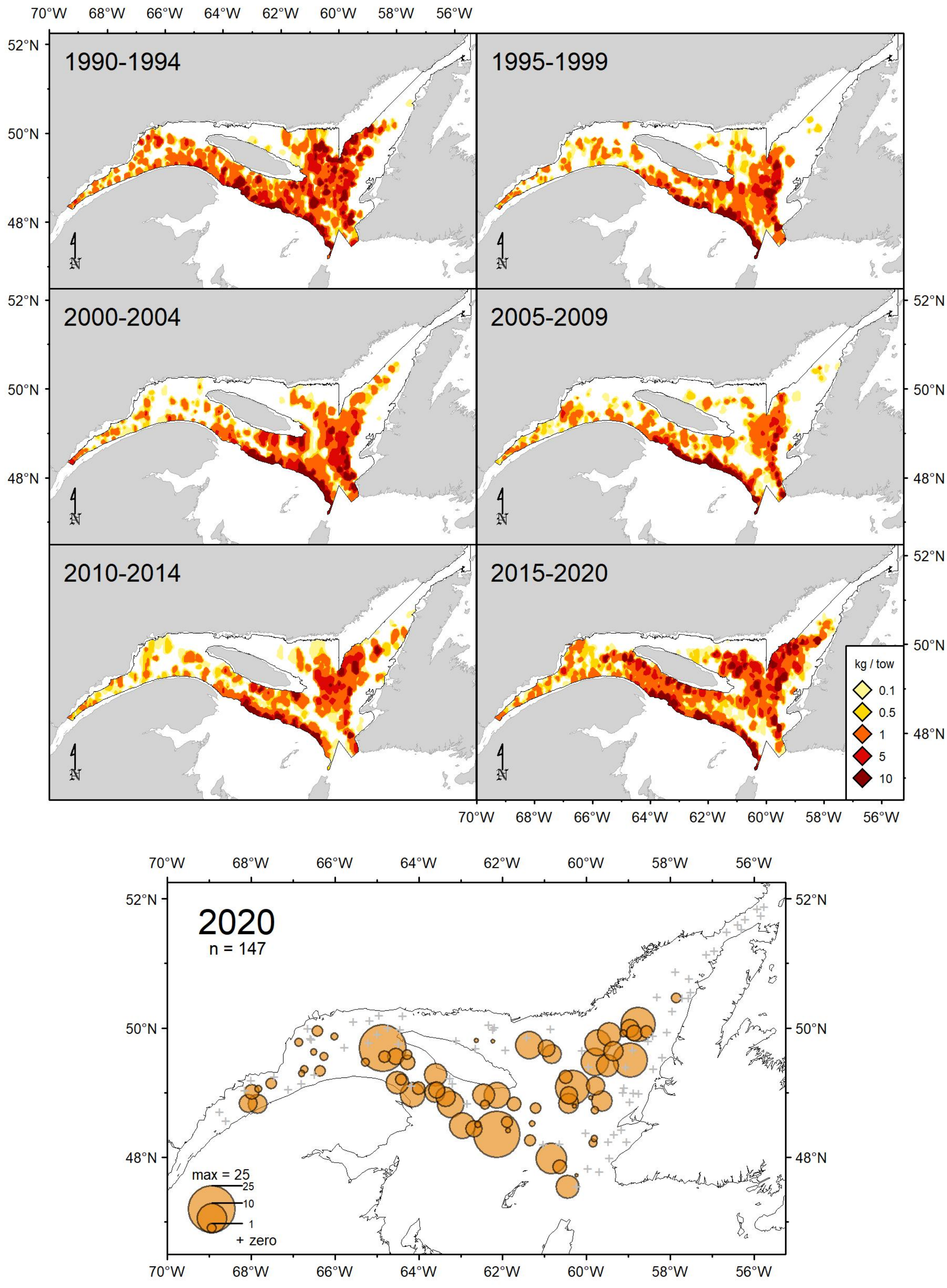


Figure 29. White hake catch rates (kg/15 minutes tow) distribution.

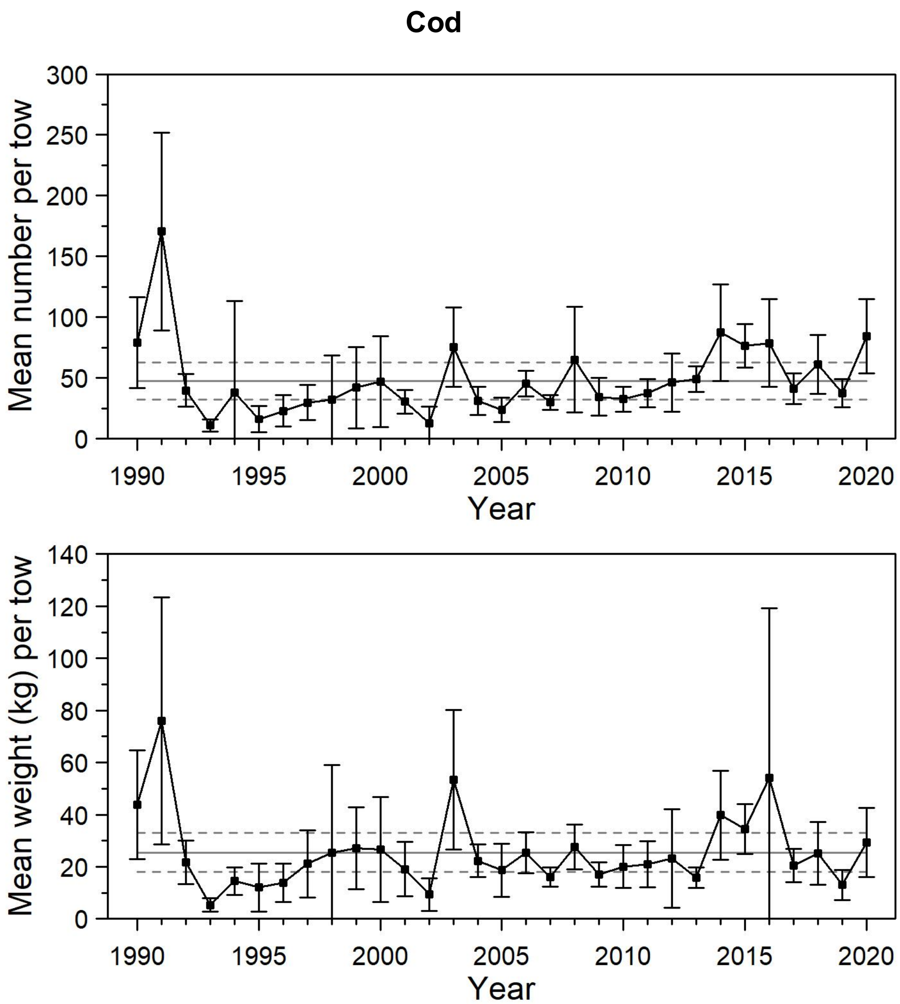


Figure 30. Mean numbers and mean weights per 15 minutes tow observed during the survey for cod in 4RS. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

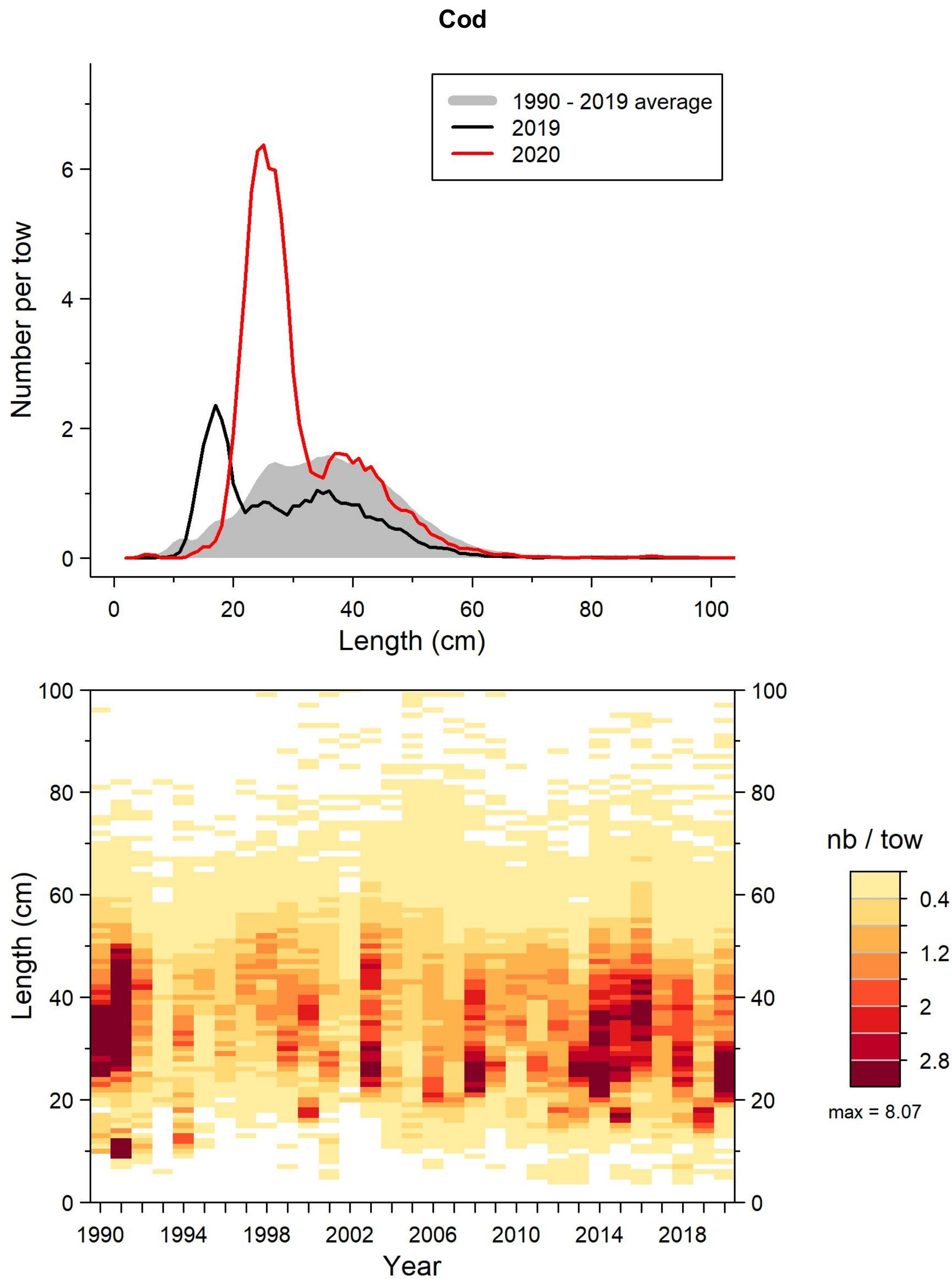


Figure 31. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for cod in 4RS.

Cod

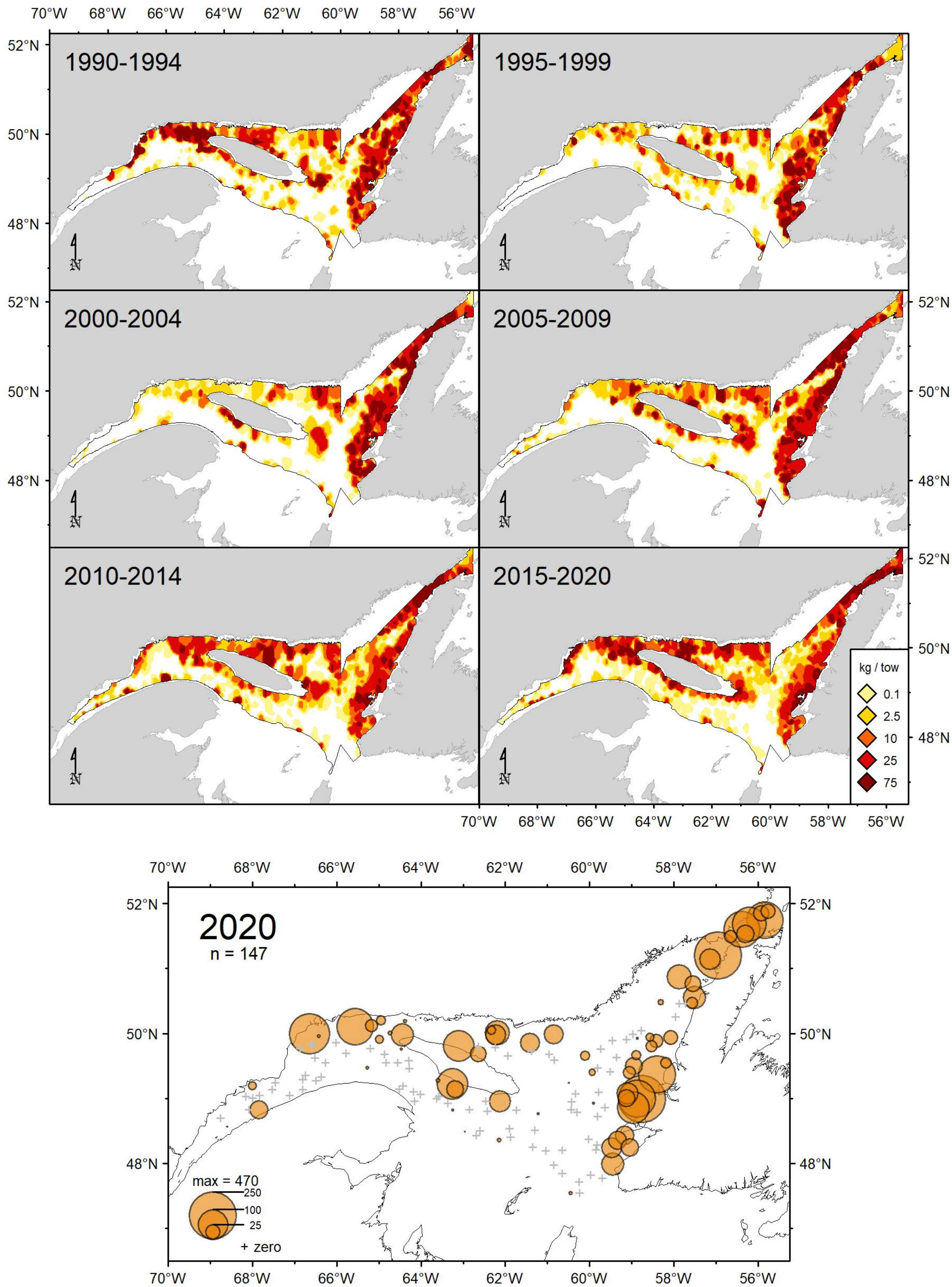


Figure 32. Cod catch rates (kg/15 minutes tow) distribution.

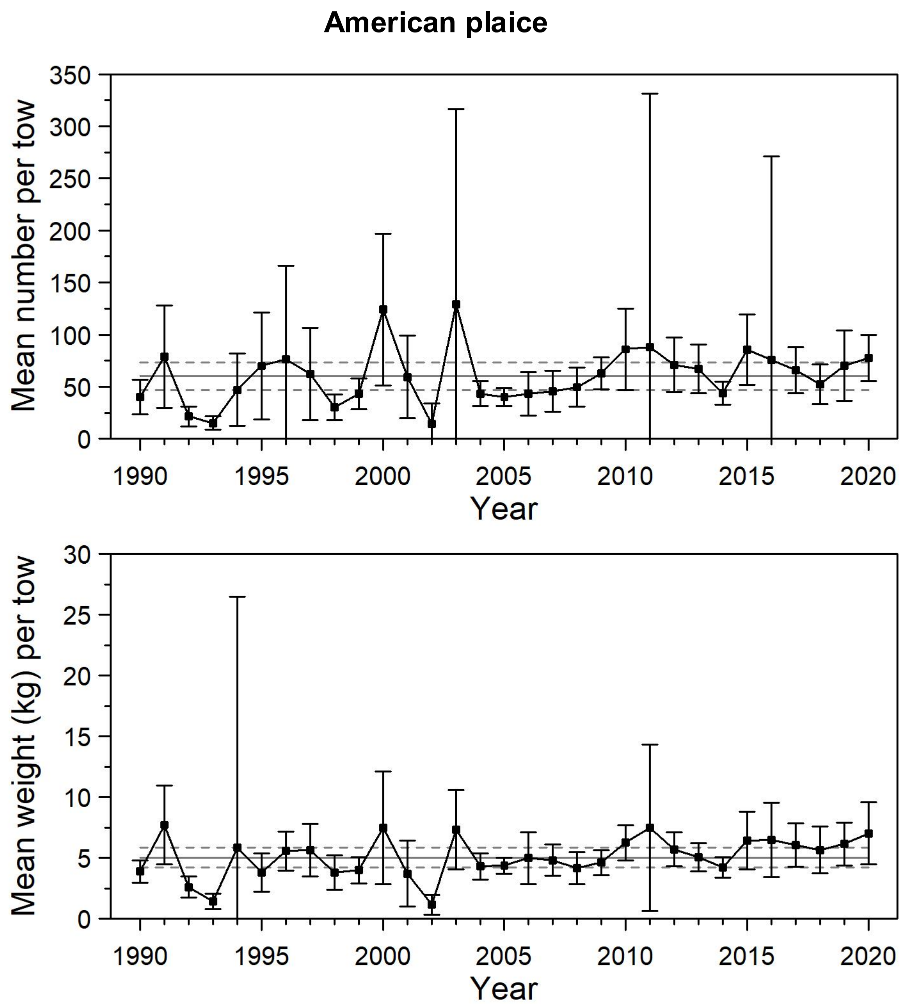
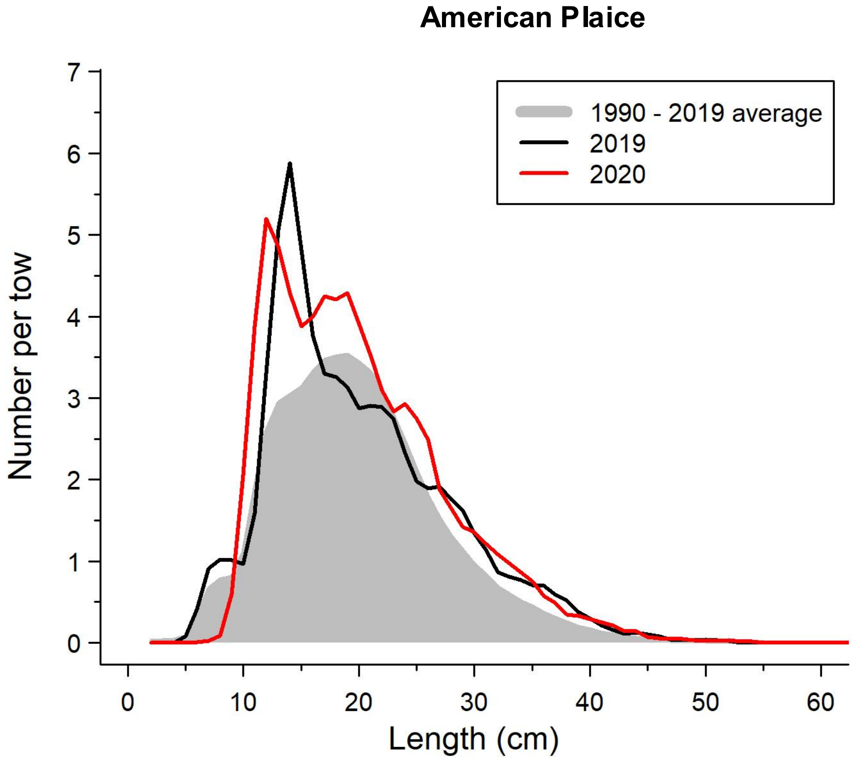


Figure 33. Mean numbers and mean weights per 15 minutes tow observed during the survey for American plaice in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).



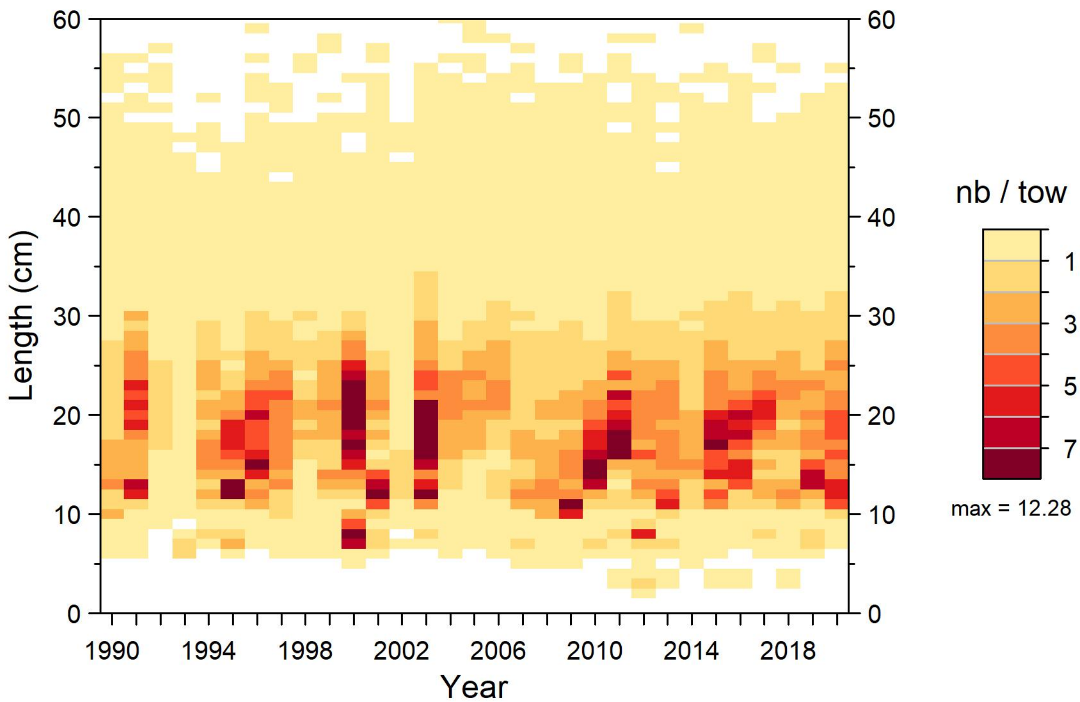


Figure 34. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for American plaice in 4RST.

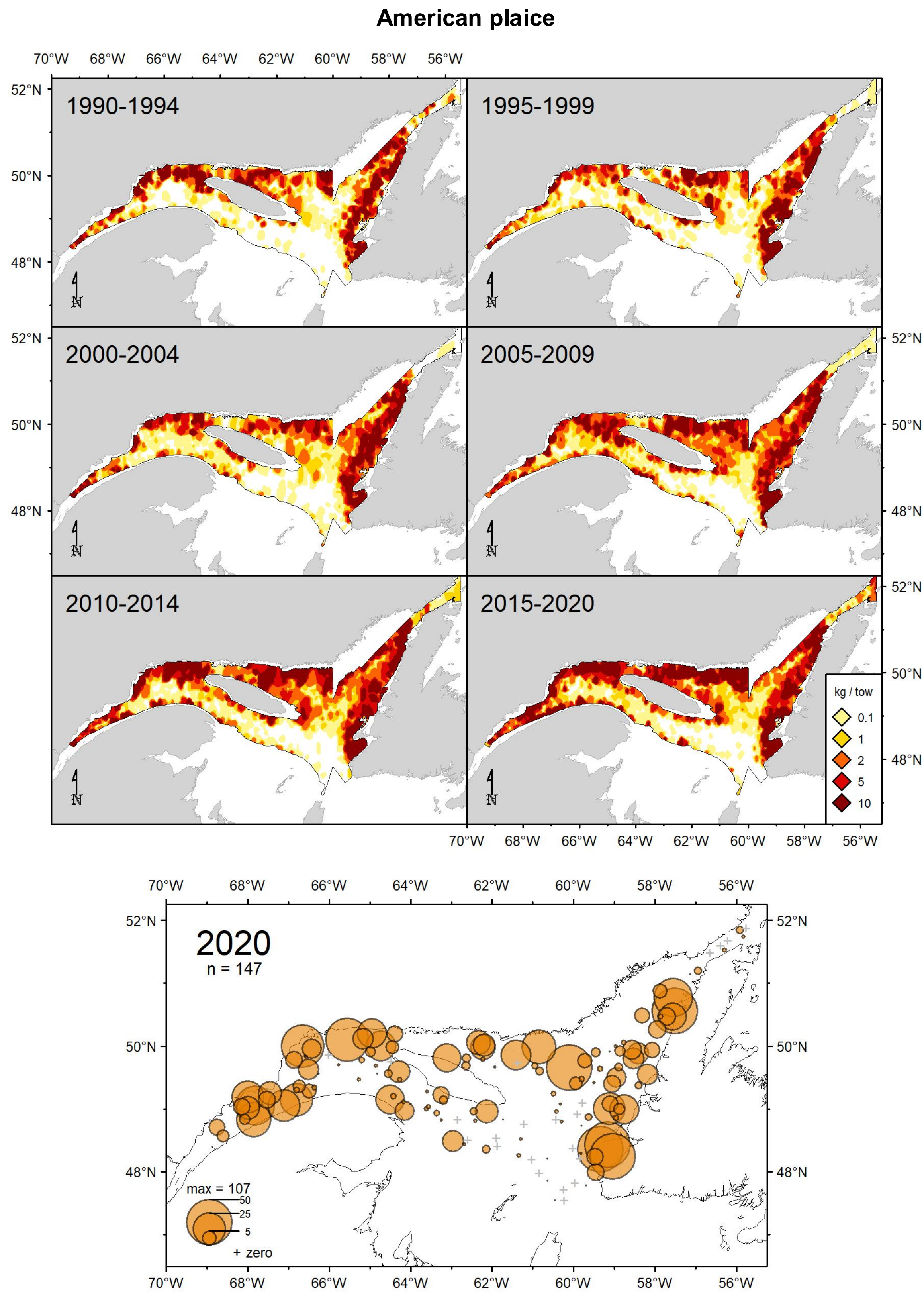


Figure 35. American plaice catch rates (kg/15 minutes tow) distribution.

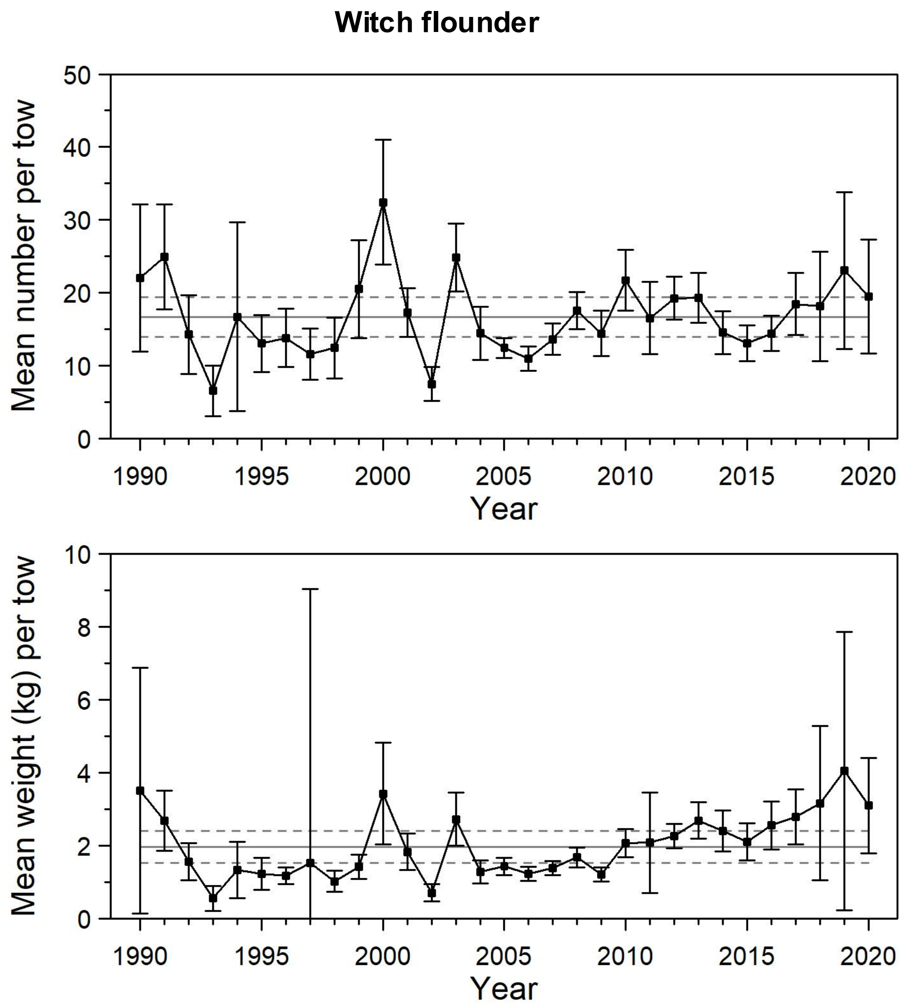


Figure 36. Mean numbers and mean weights per 15 minutes tow observed during the survey for witch flounder in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

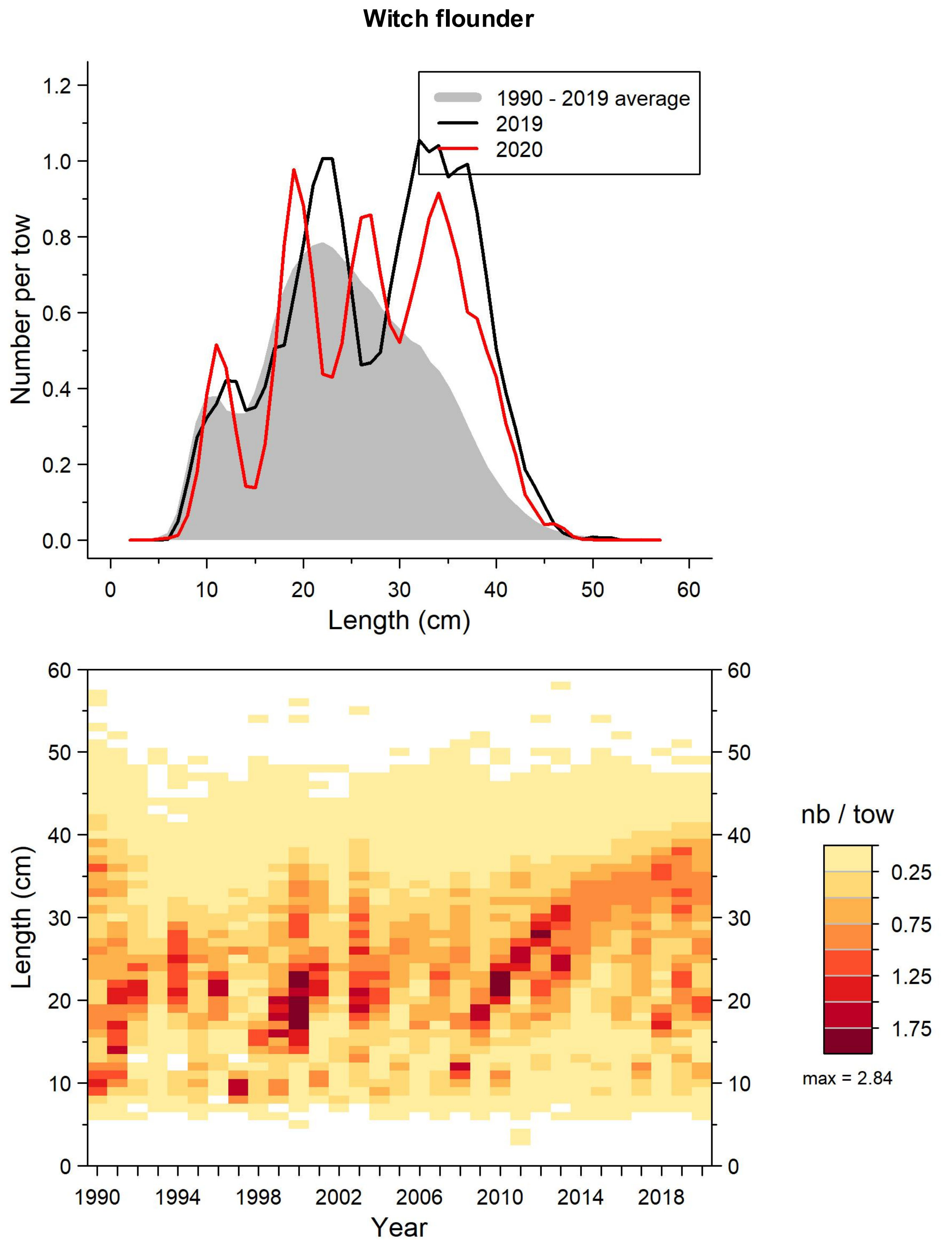
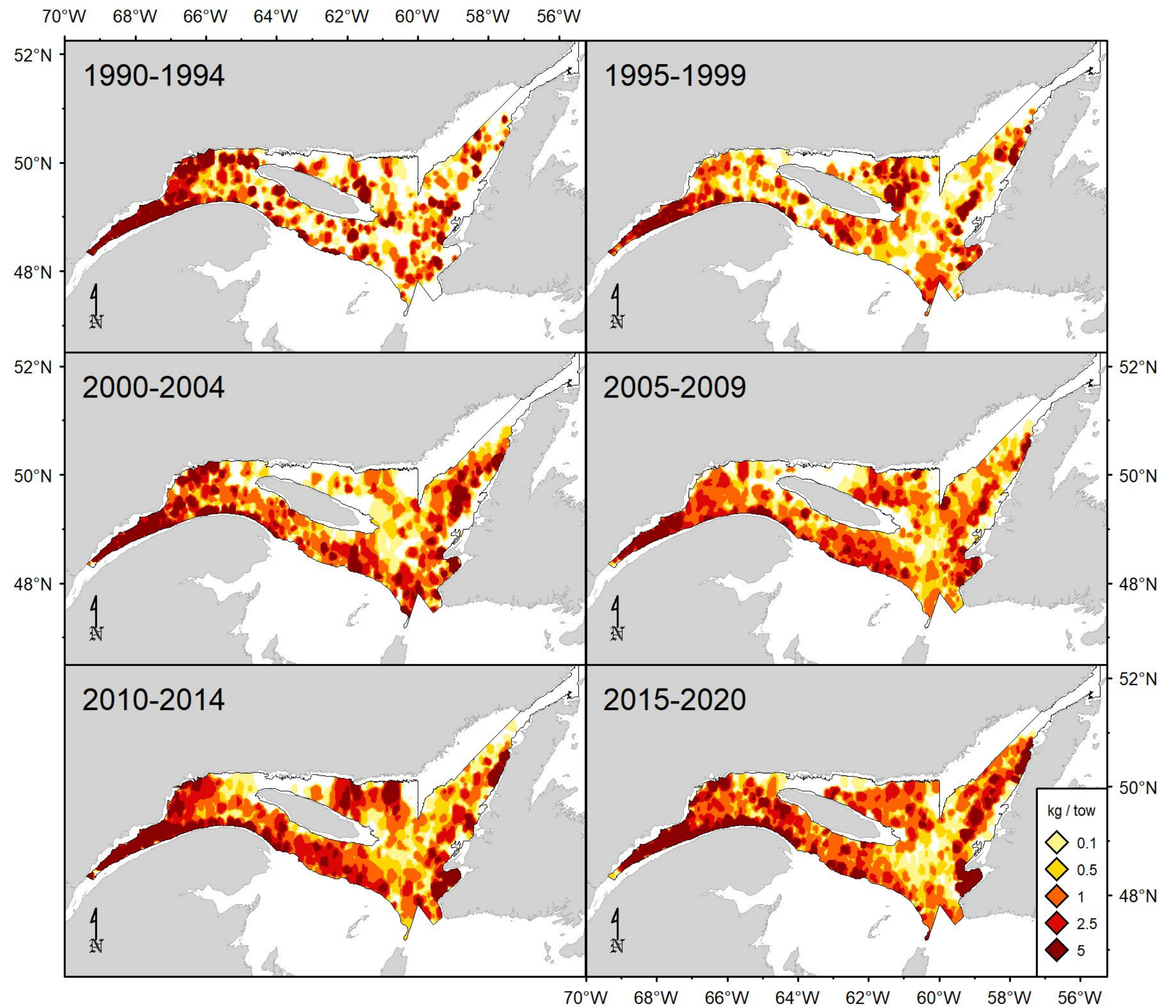


Figure 37. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for witch flounder in 4RST.

Witch flounder



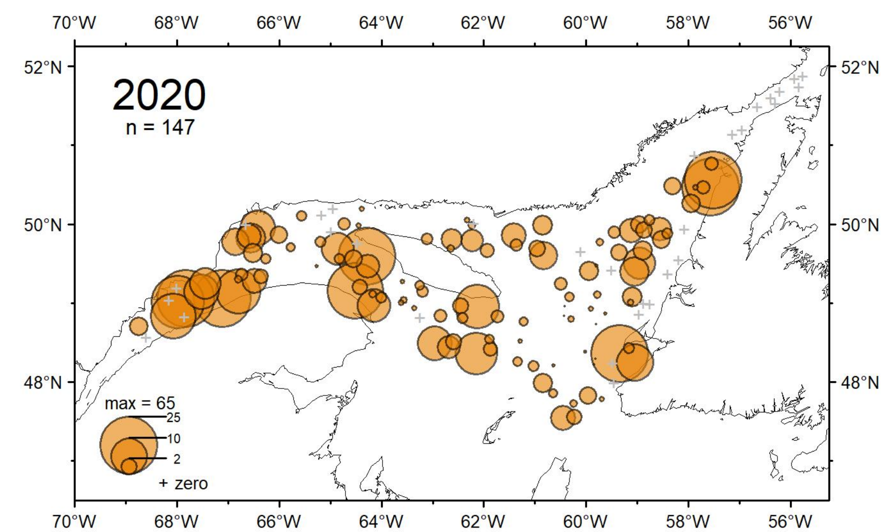


Figure 38. Witch flounder catch rates (kg/15 minutes tow) distribution.

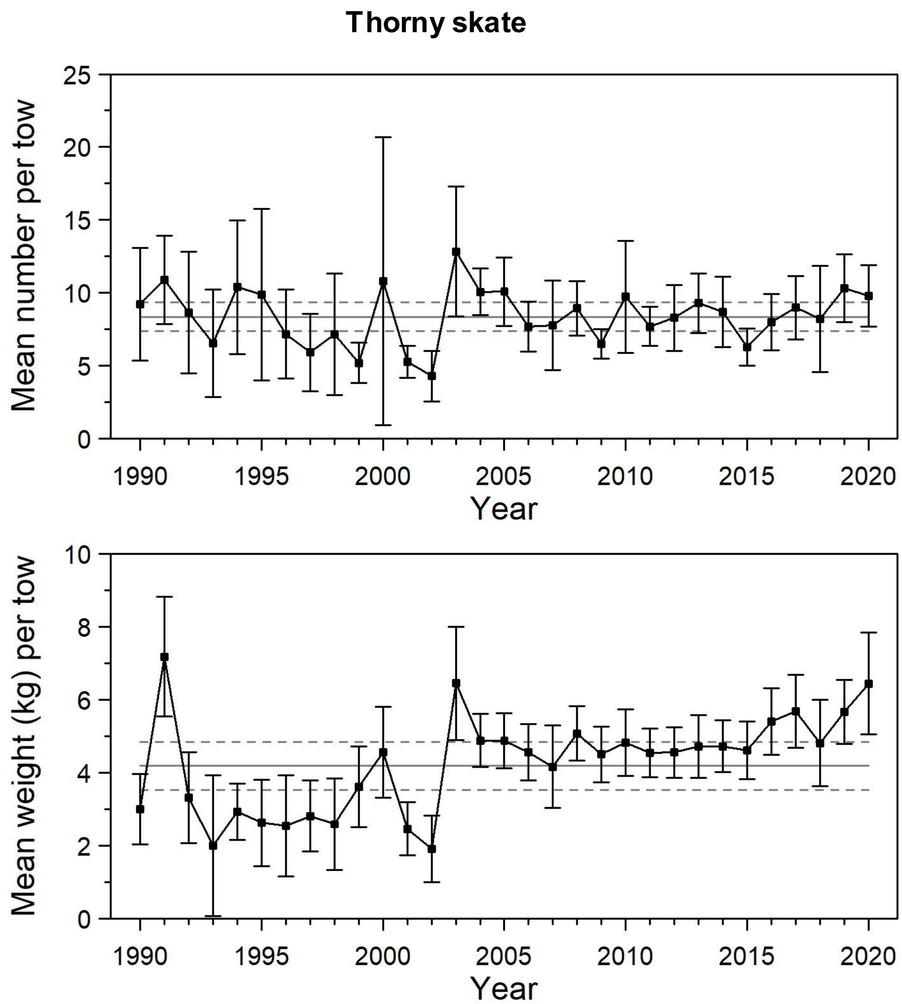


Figure 39. Mean numbers and mean weights per 15 minutes tow observed during the survey for thorny skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

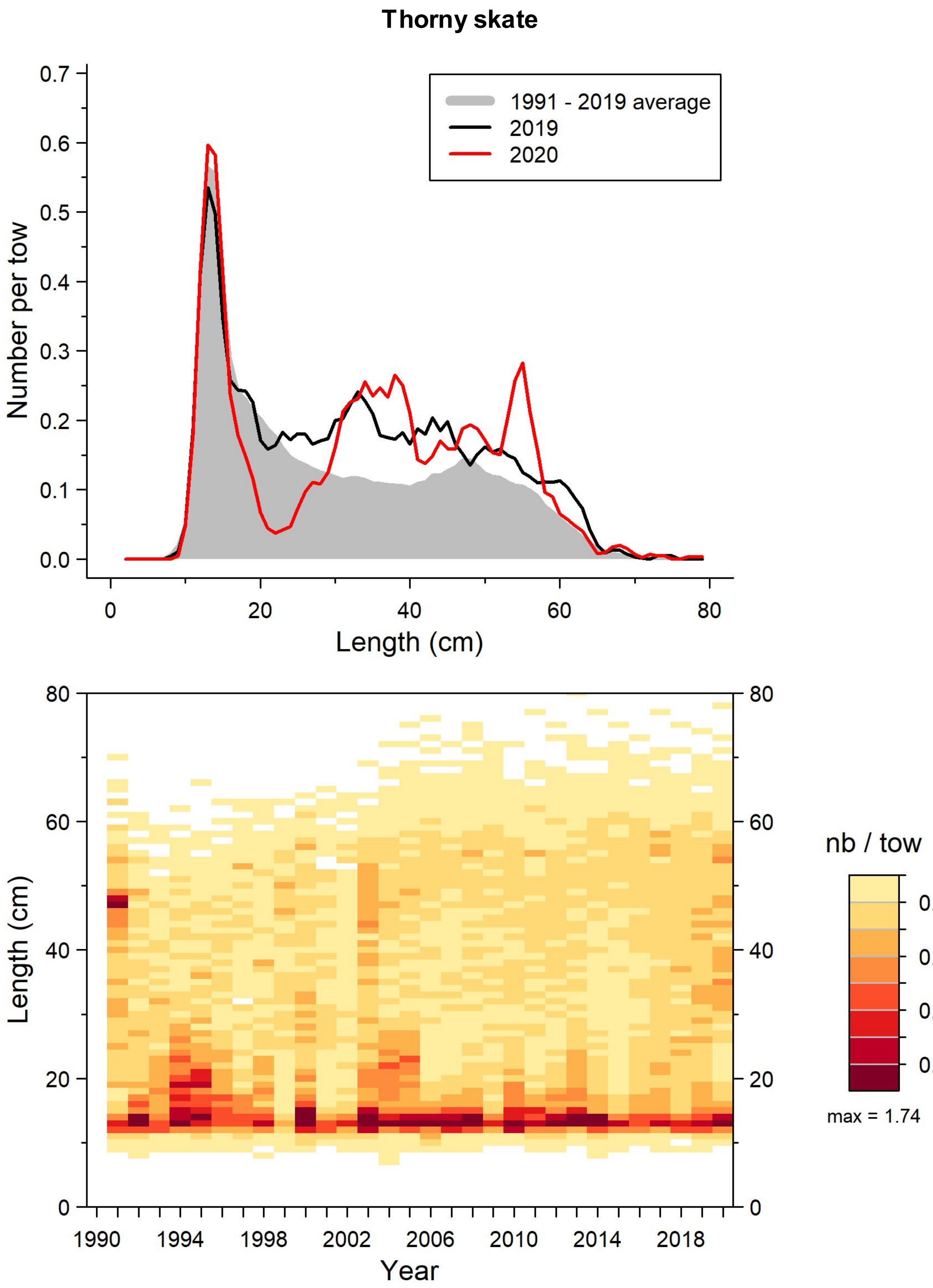


Figure 40. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for thorny skate in 4RST.

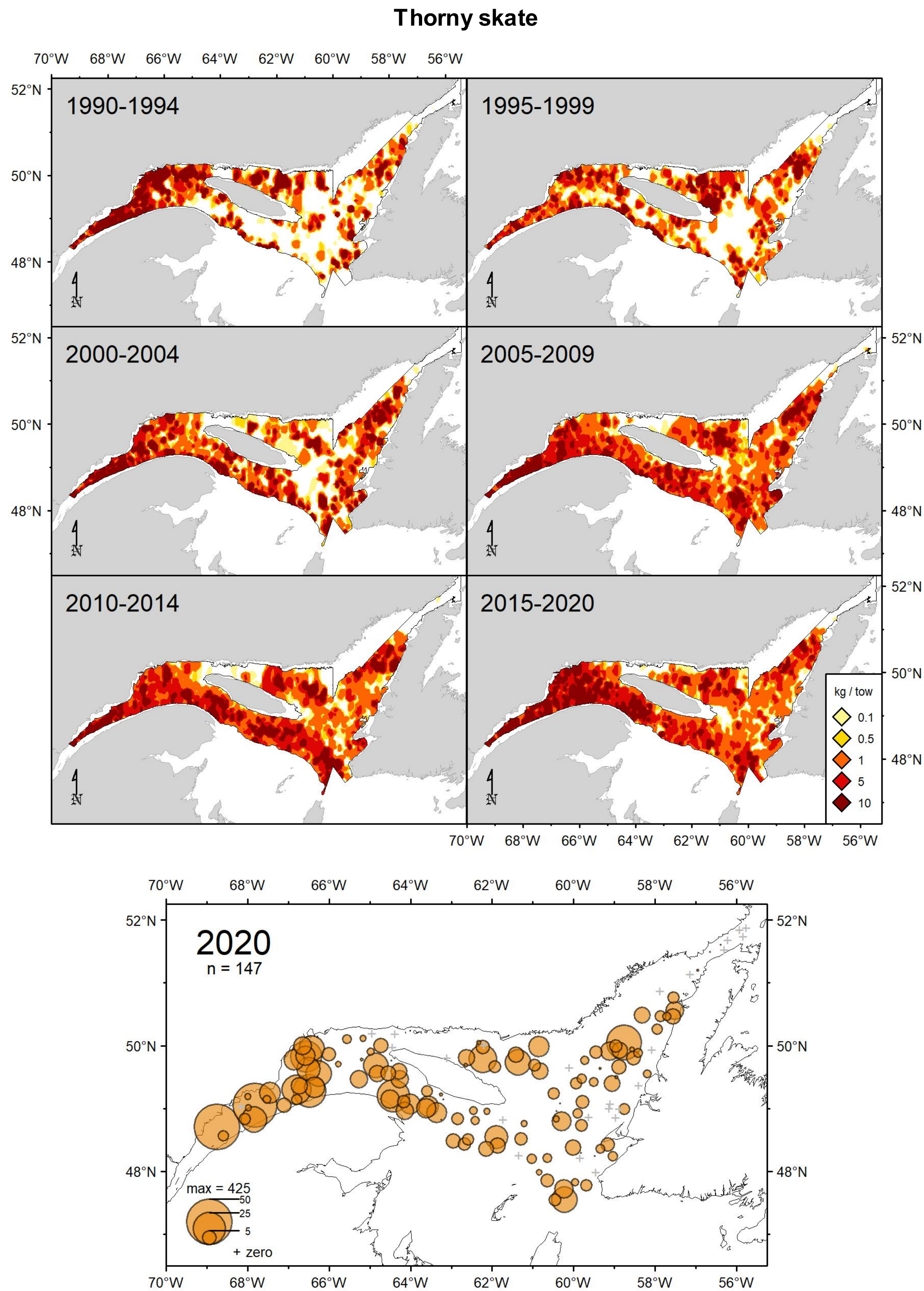


Figure 41. Thorny skate catch rates (kg/15 minutes tow) distribution.

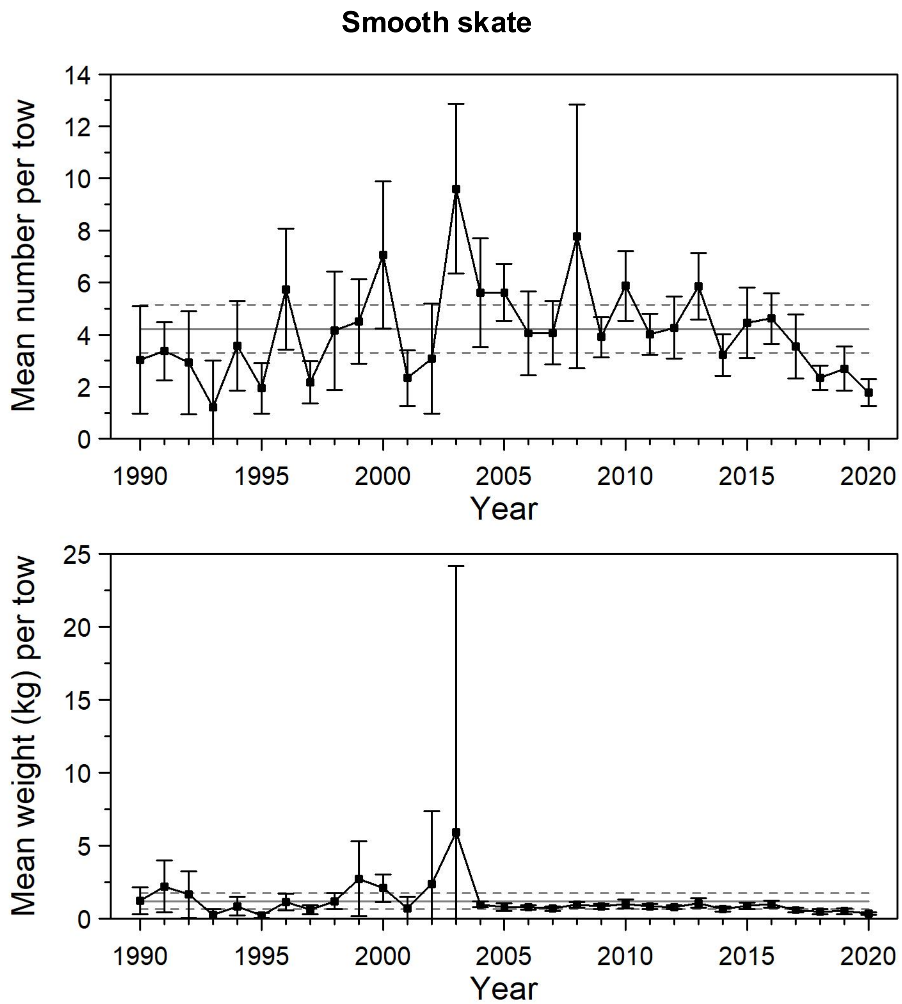


Figure 42. Mean numbers and mean weights per 15 minutes tow observed during the survey for smooth skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

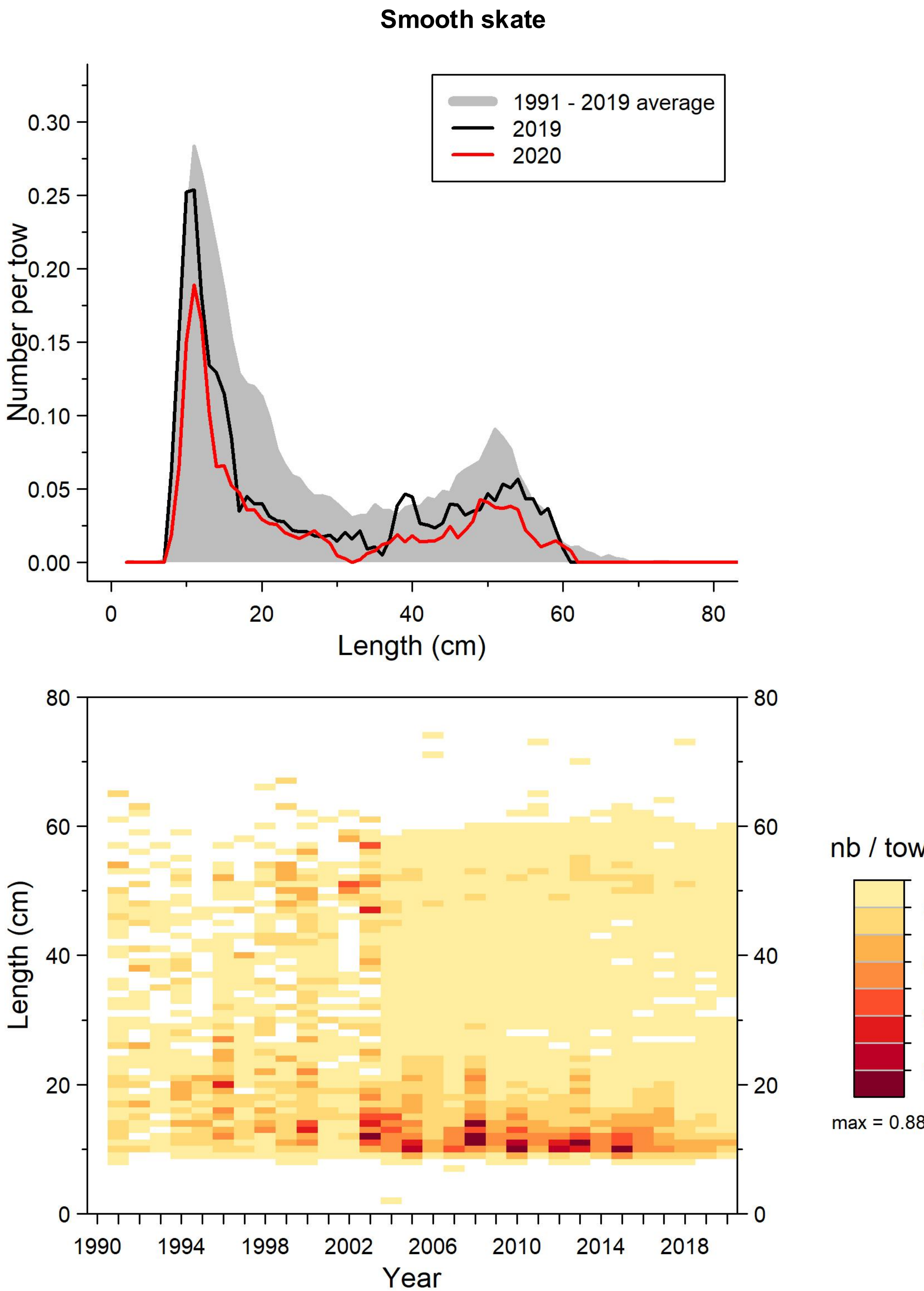


Figure 43. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for smooth skate in 4RST.

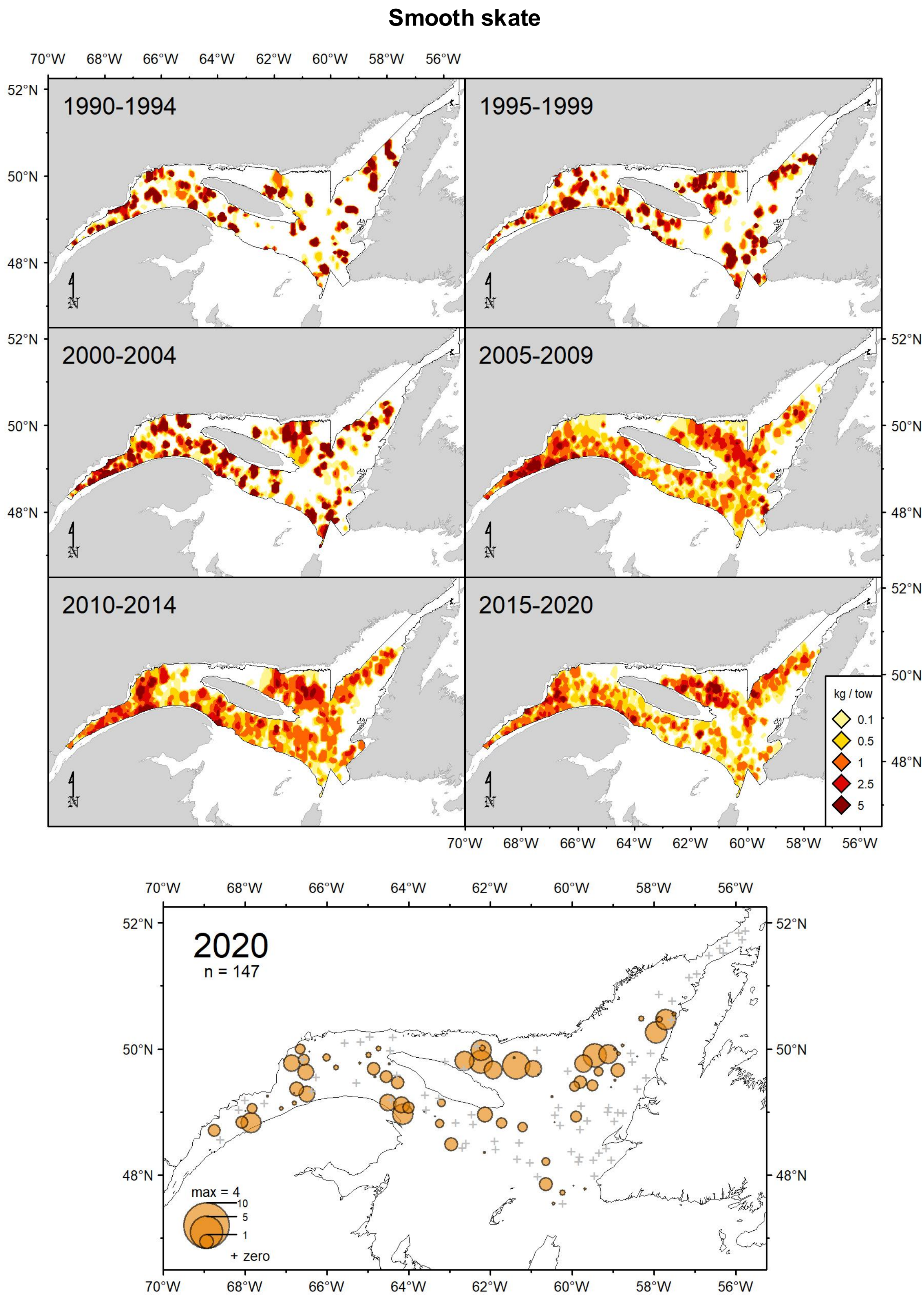


Figure 44. Smooth skate catch rates (kg/15 minutes tow) distribution.

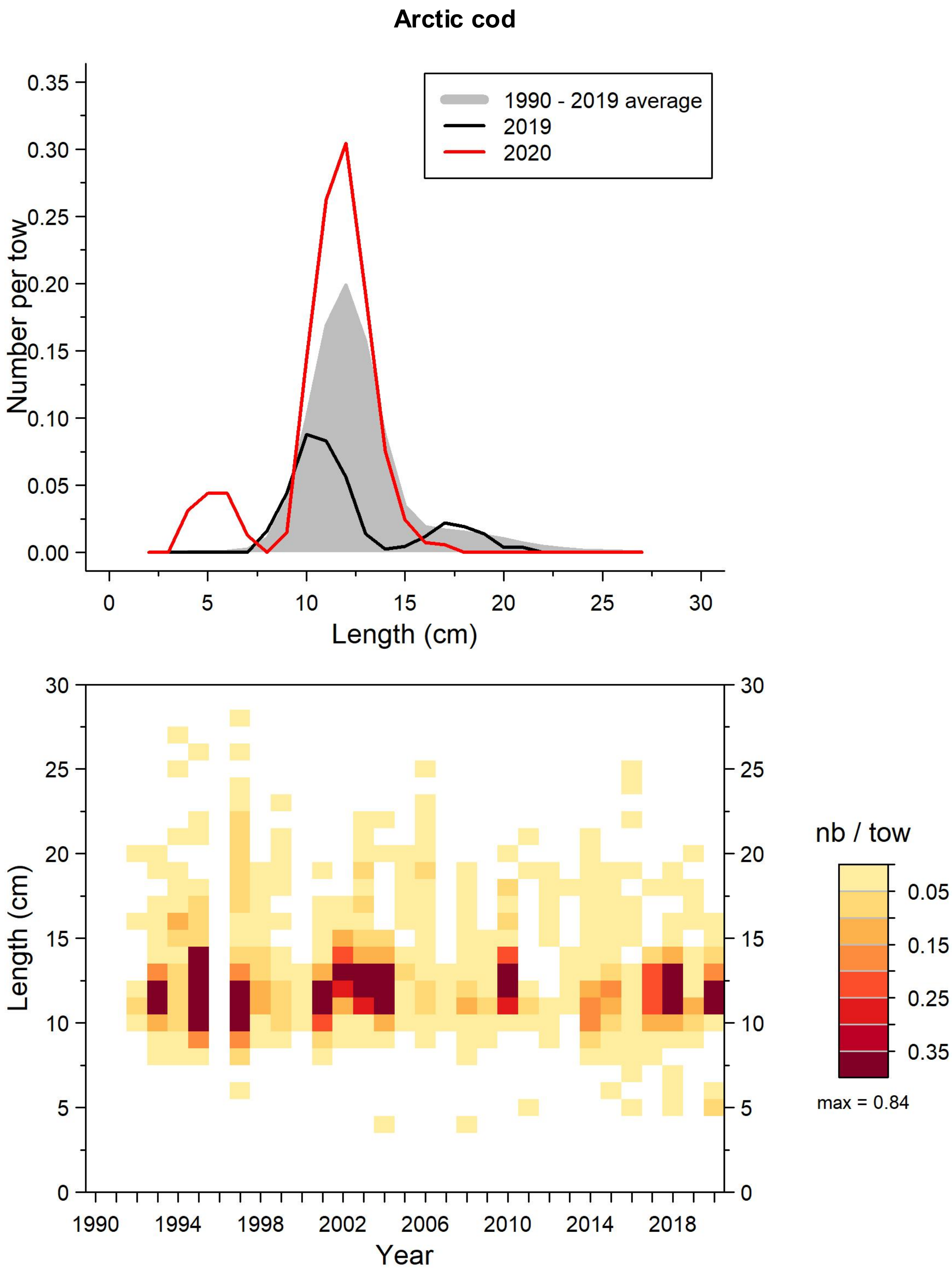


Figure 45. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Arctic cod in 4RST.

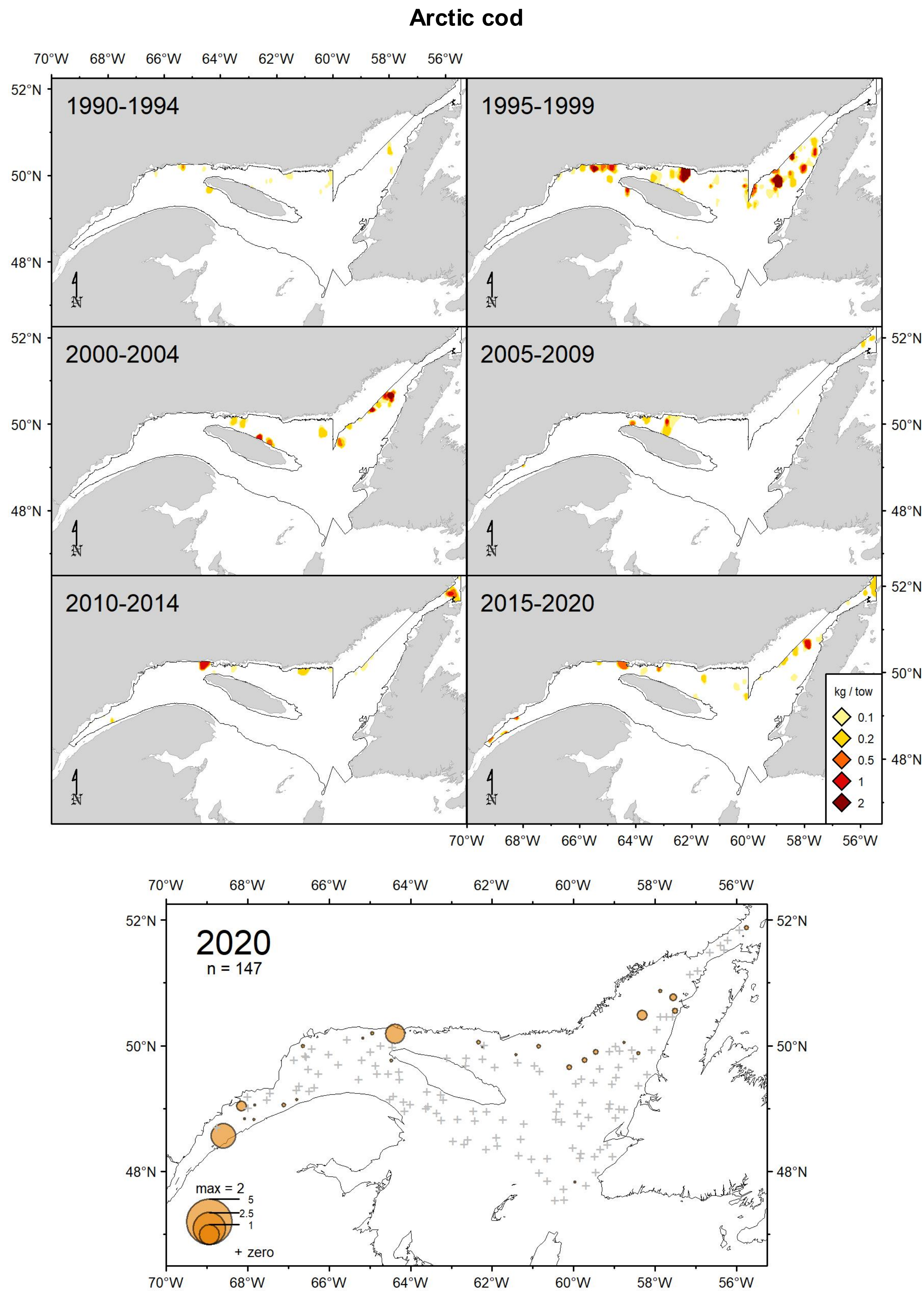


Figure 46. Arctic cod catch rates (kg/15 minutes tow) distribution.

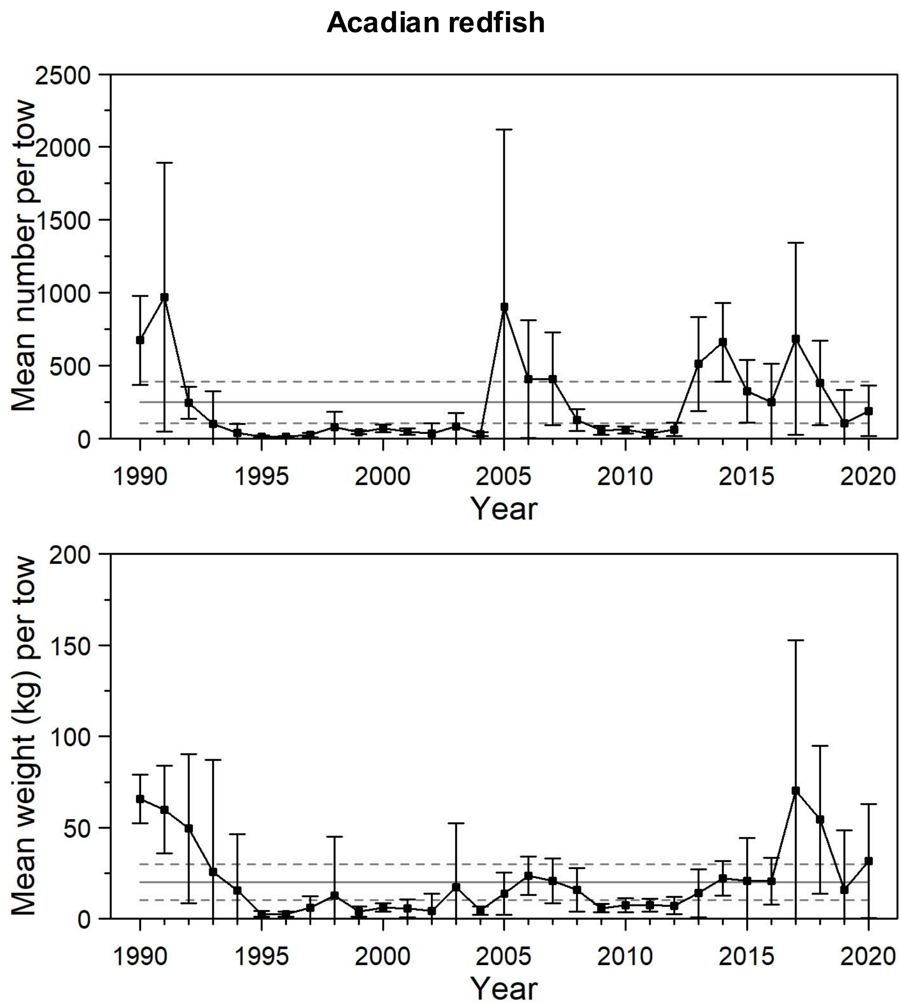


Figure 47. Mean numbers and mean weights per 15 minutes tow observed during the survey for Acadian redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

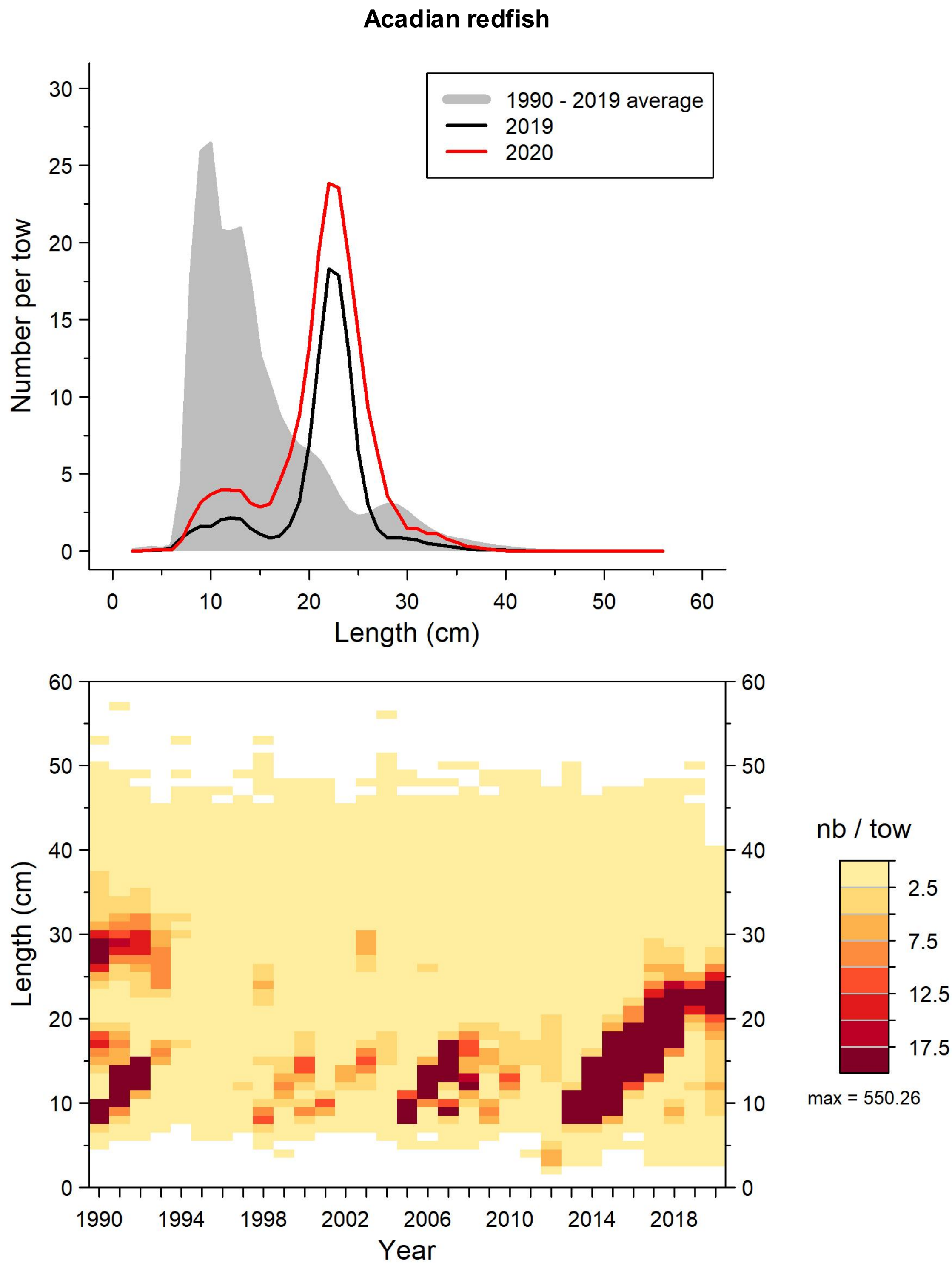
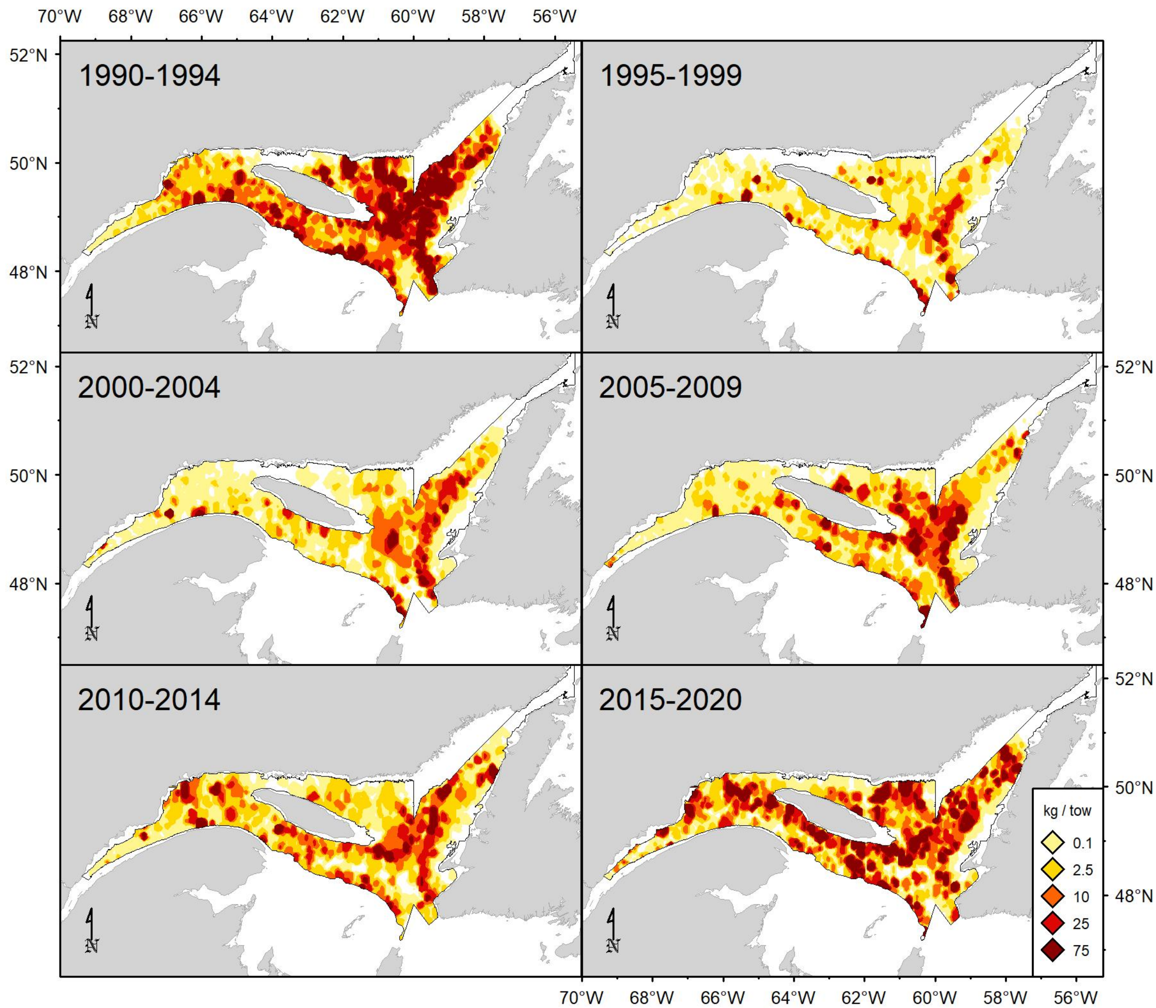


Figure 48. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Acadian redfish in 4RST.

Acadian redfish



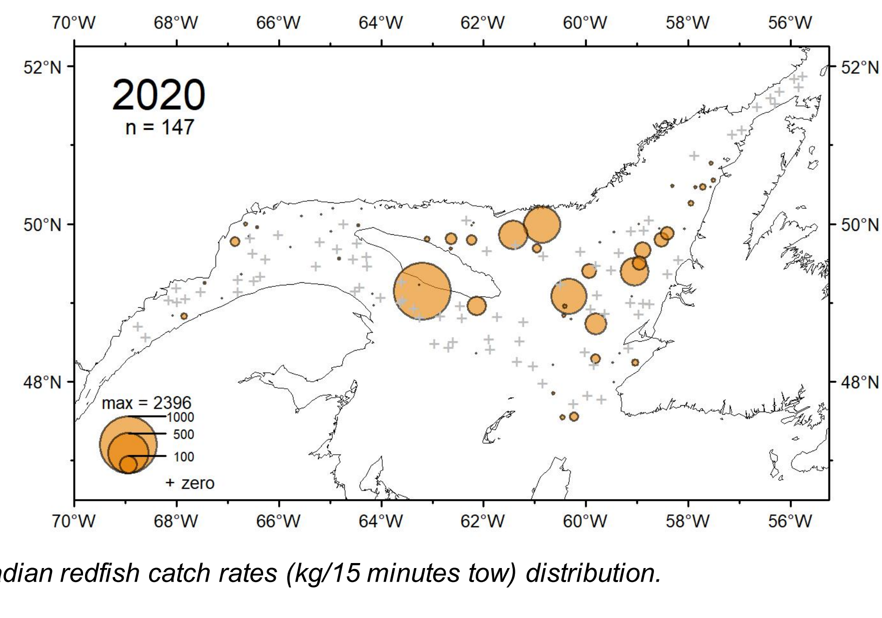


Figure 49. Acadian redfish catch rates (kg/15 minutes tow) distribution.

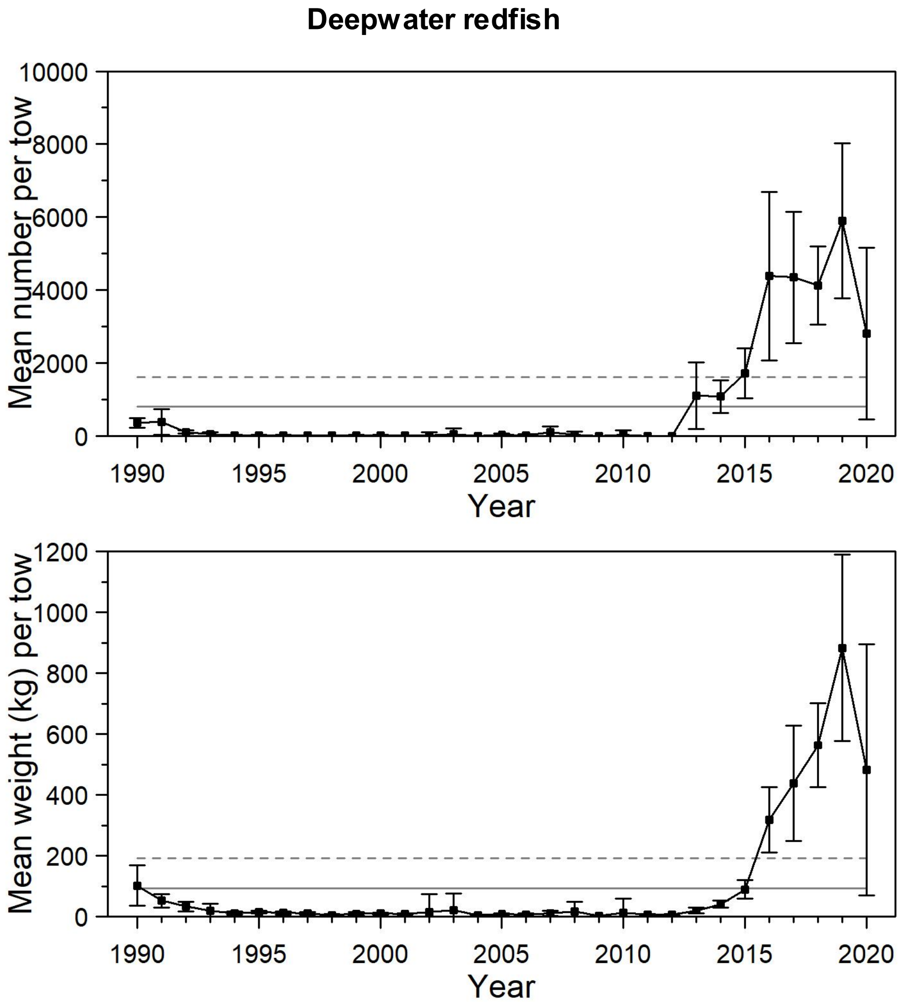


Figure 50. Mean numbers and mean weights per 15 minutes tow observed during the survey for deepwater redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

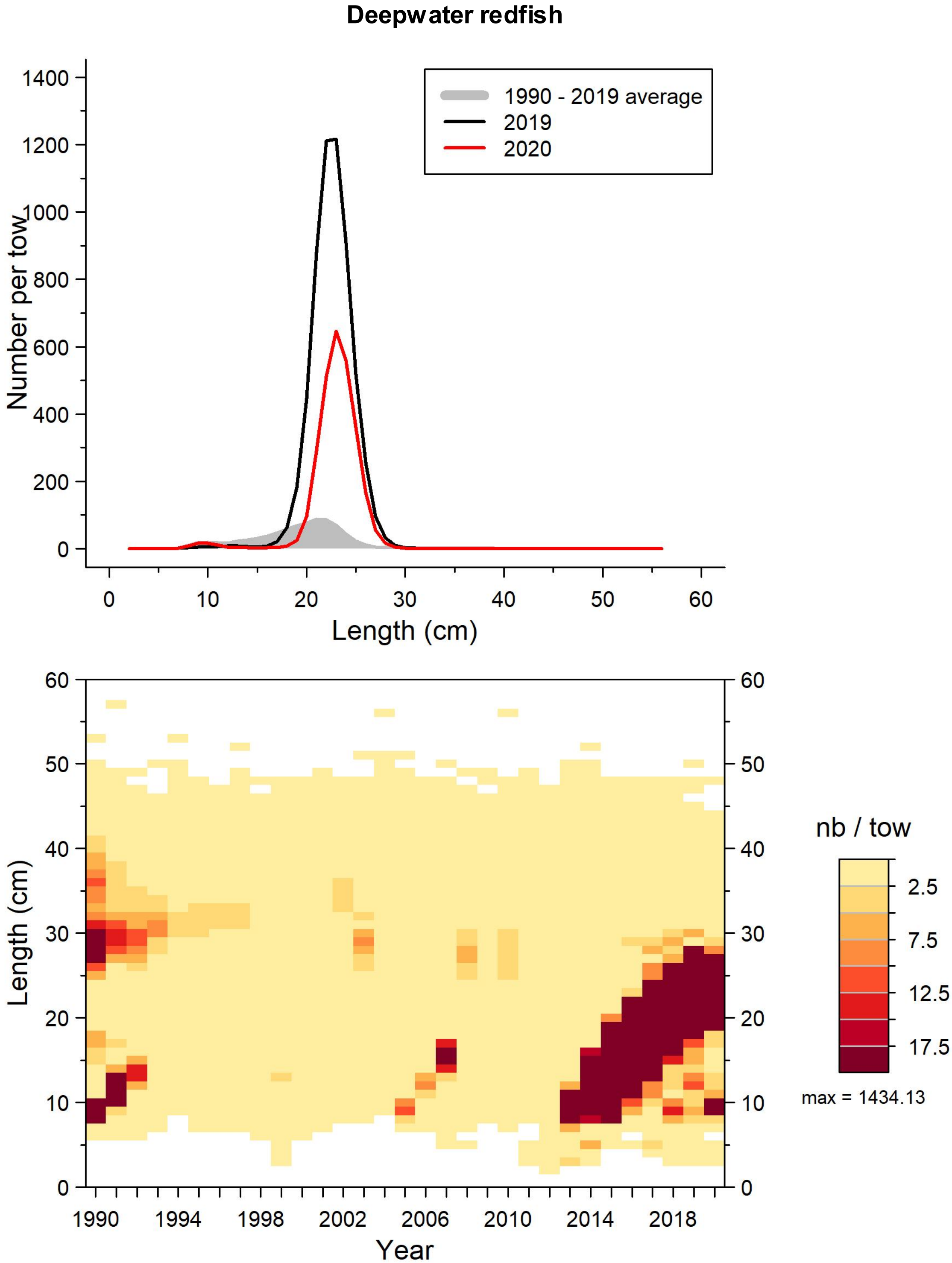


Figure 51. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for deepwater redfish in 4RST.

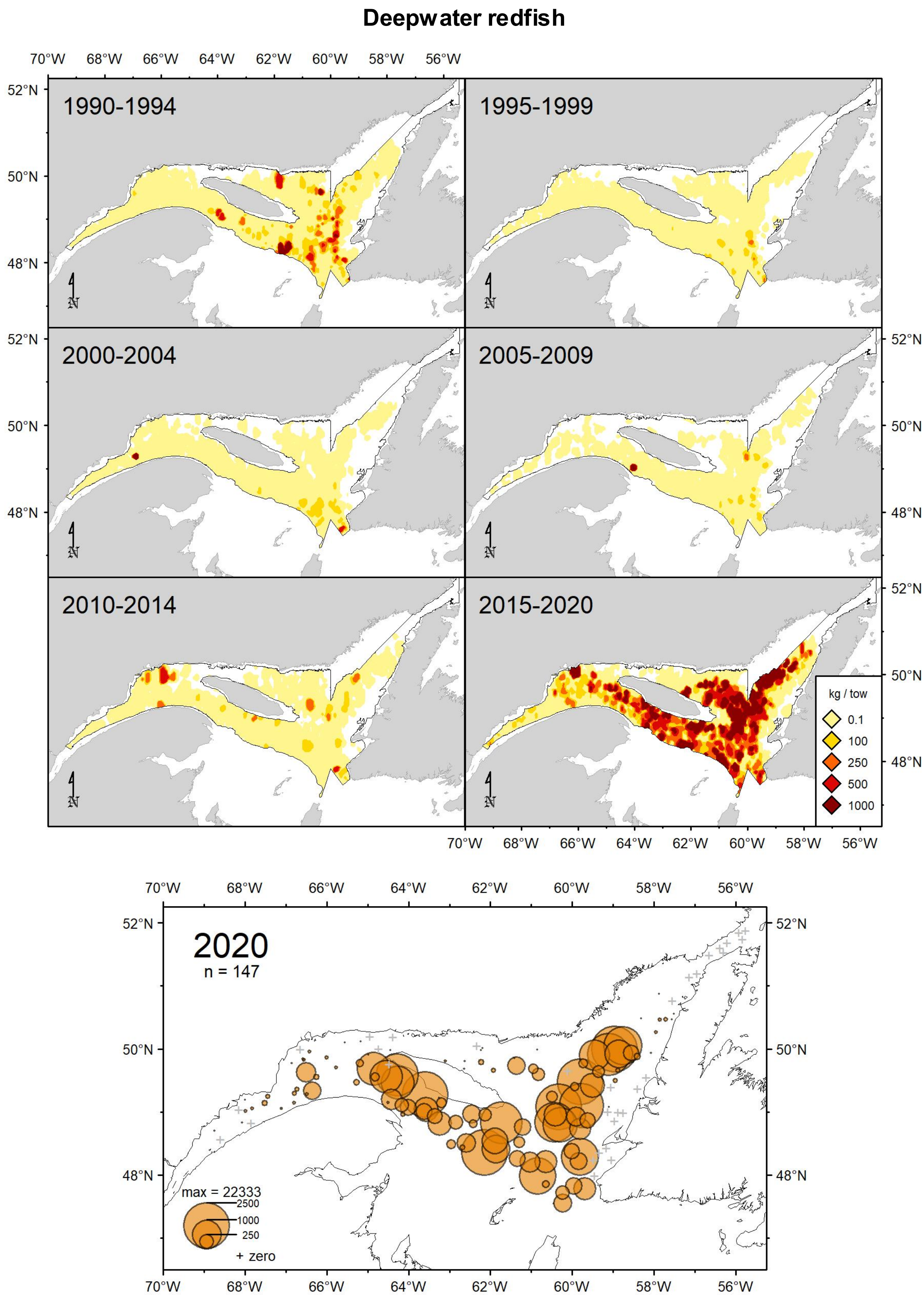


Figure 52. Deepwater redfish catch rates (kg/15 minutes tow) distribution.

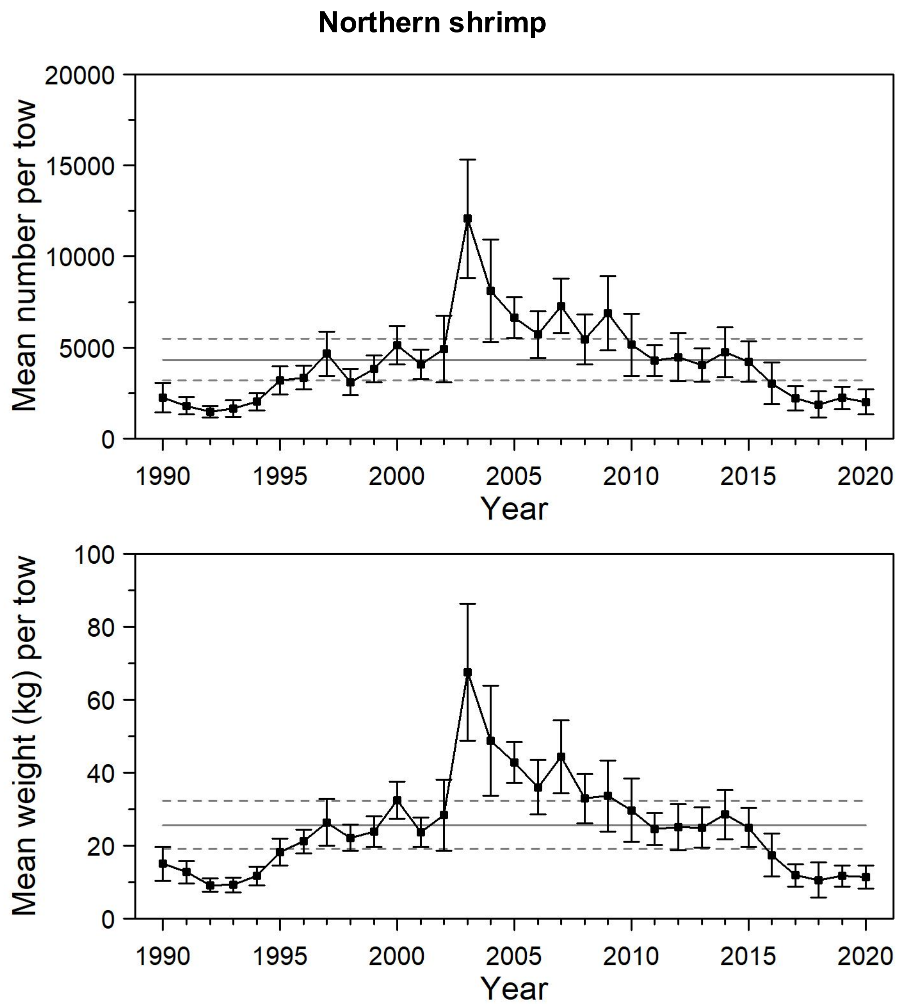


Figure 53. Mean numbers and mean weights per 15 minutes tow observed during the survey for northern shrimp in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

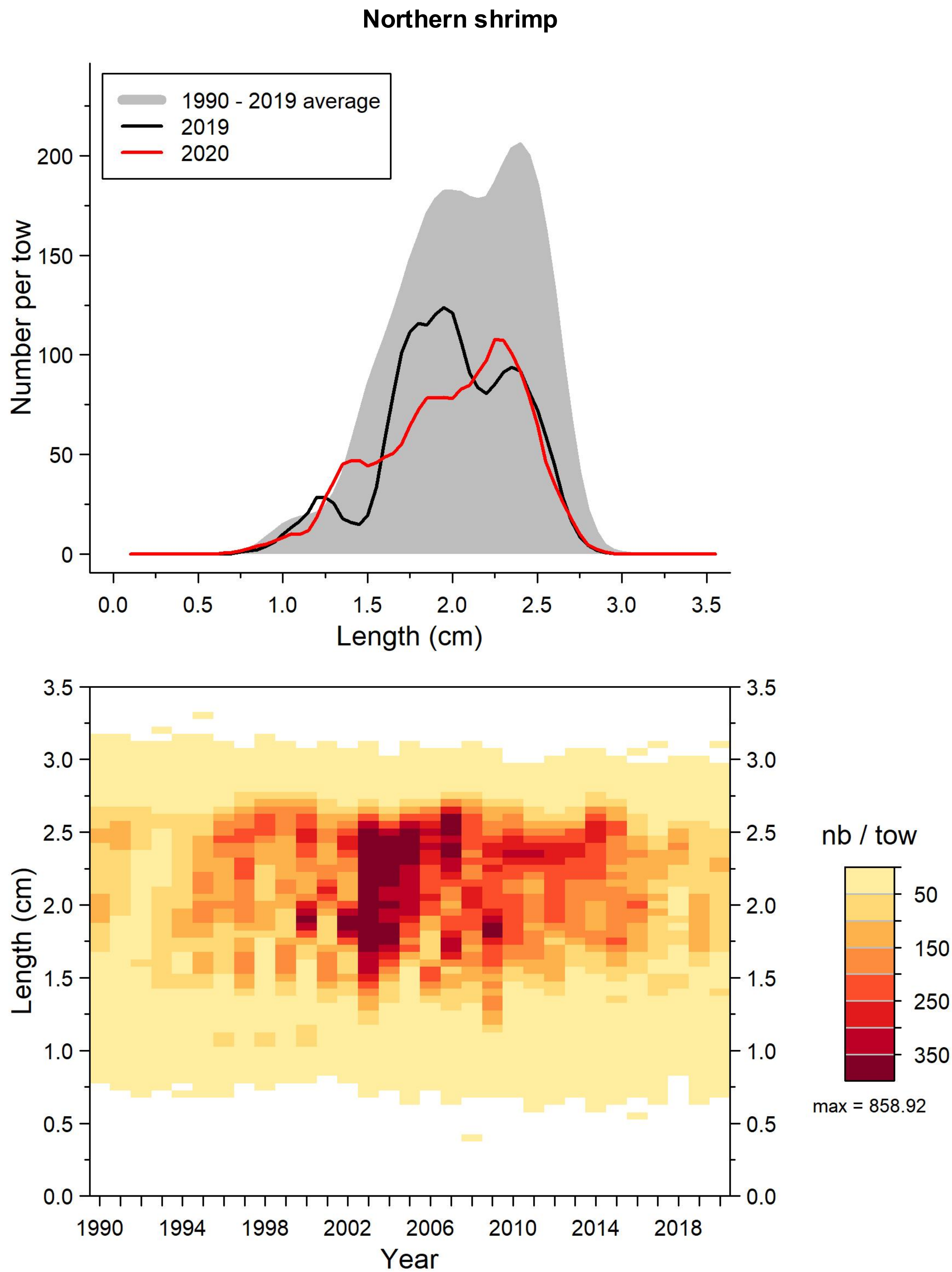


Figure 54. Carapace length frequency distributions (mean number per 15 minutes tow) observed during the survey for northern shrimp in 4RST.

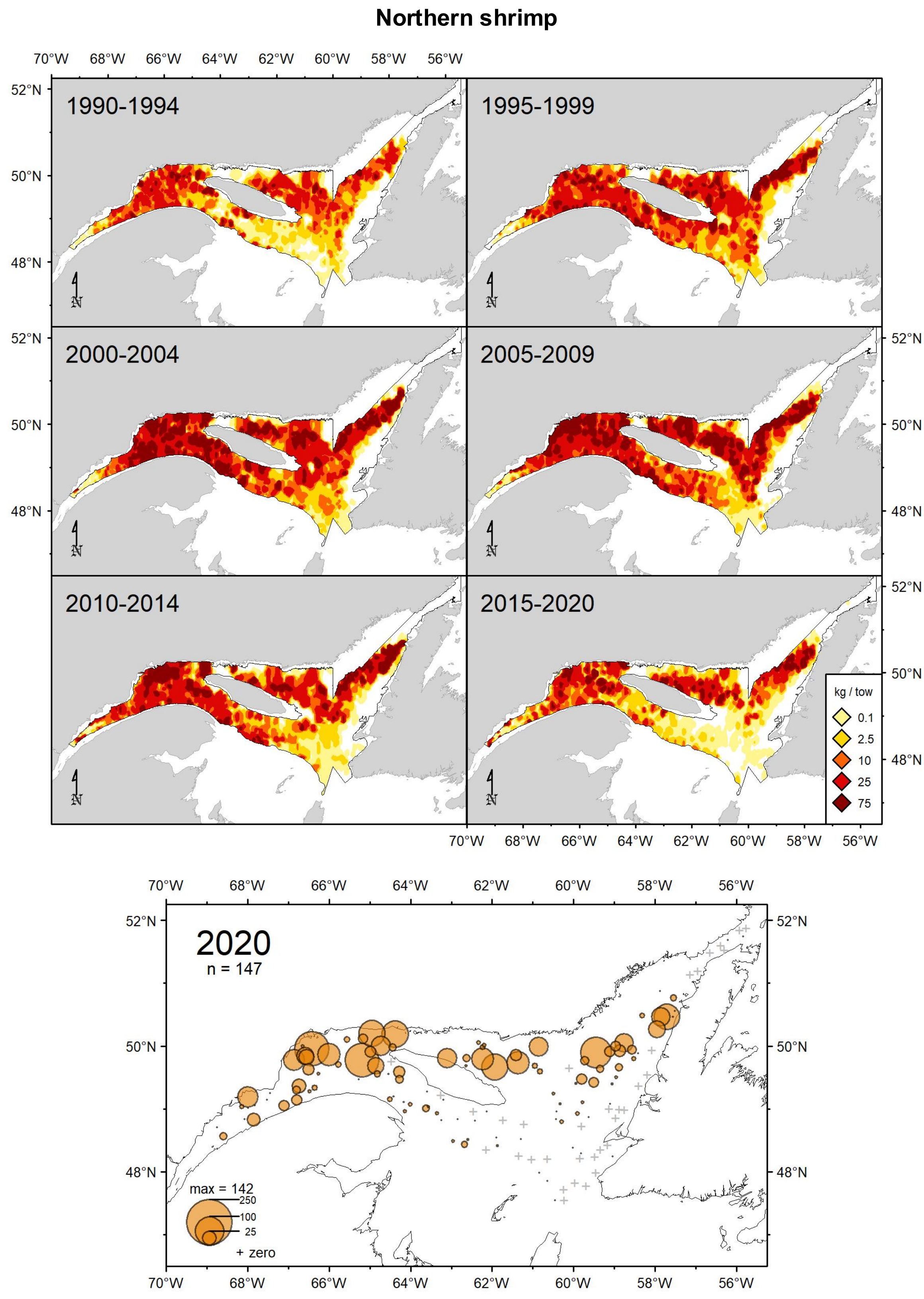


Figure 55. Northern shrimp catch rates (kg/15 minutes tow) distribution.

Northern shortfin squid

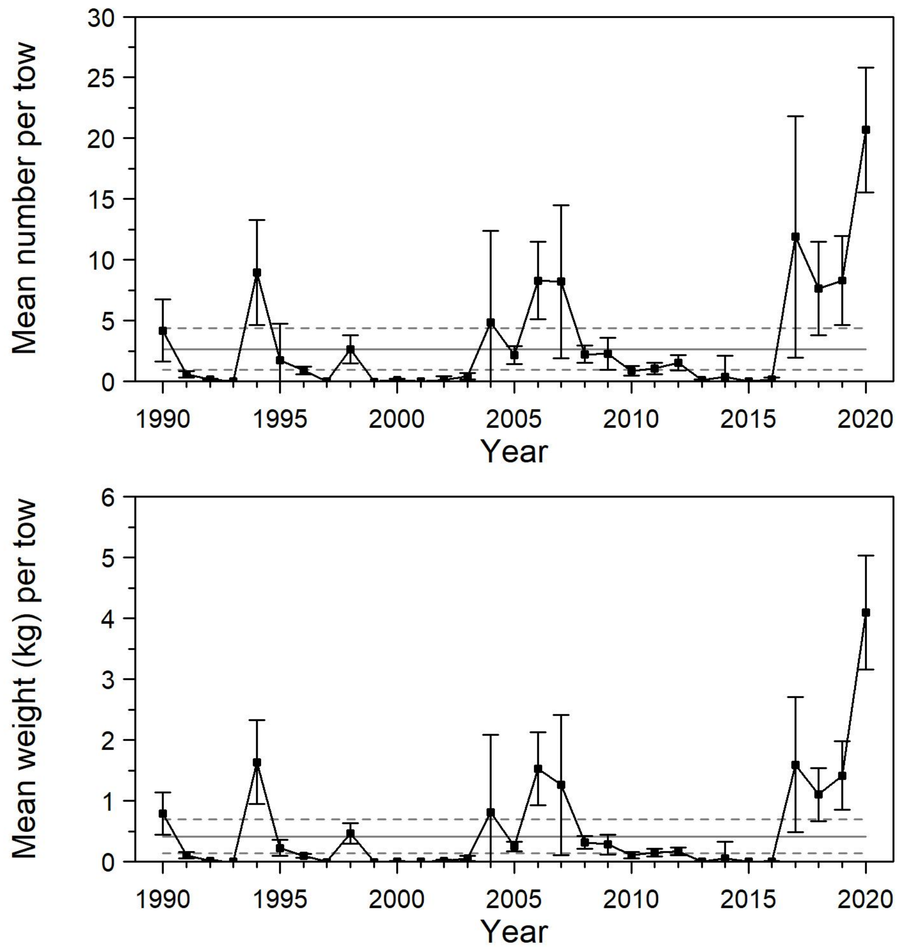


Figure 56. Mean numbers and mean weights per 15 minutes tow observed during the survey for northern shortfin squid in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2019 period (solid line) and upper and lower reference (see text) limits (dashed lines).

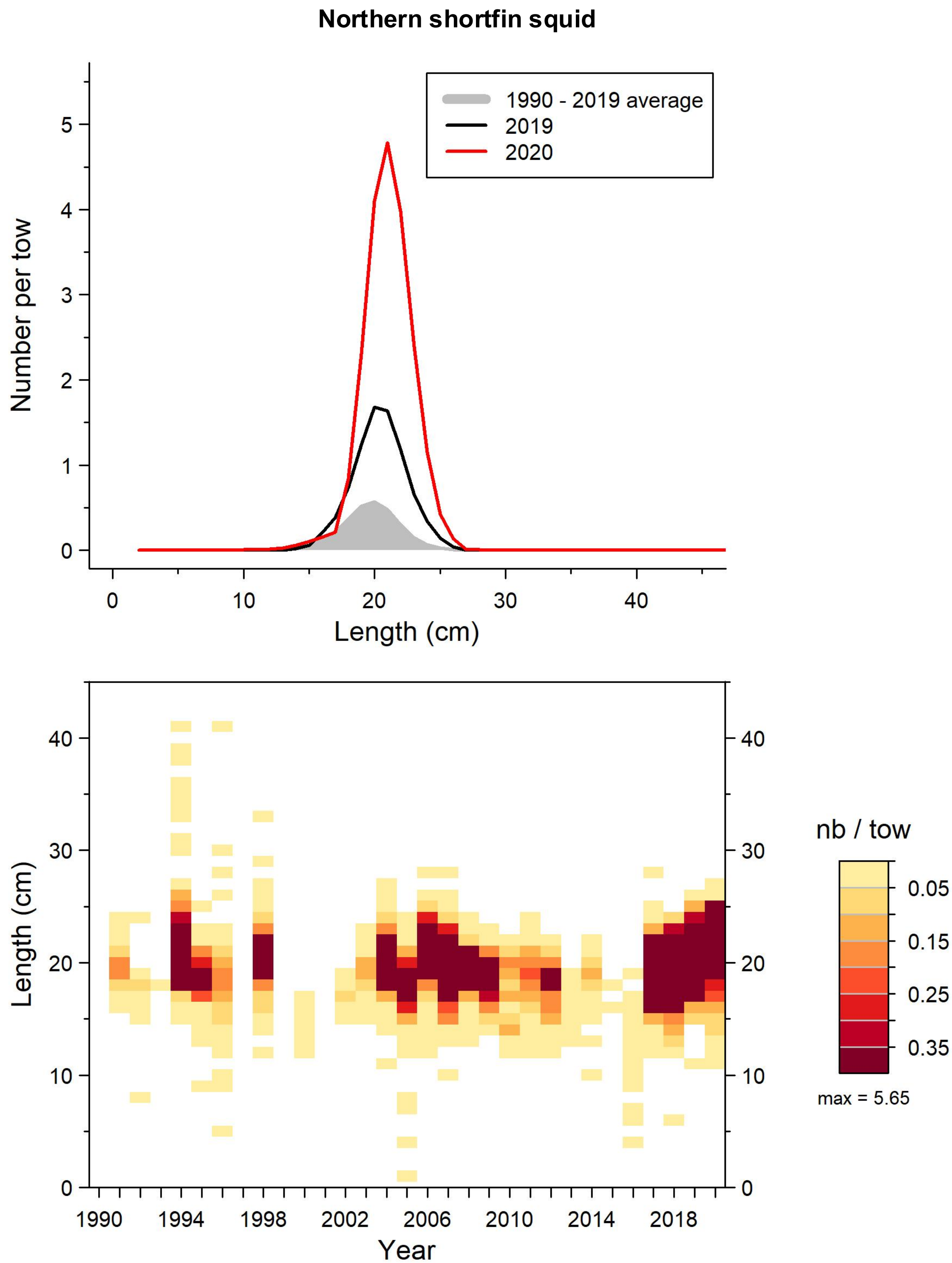
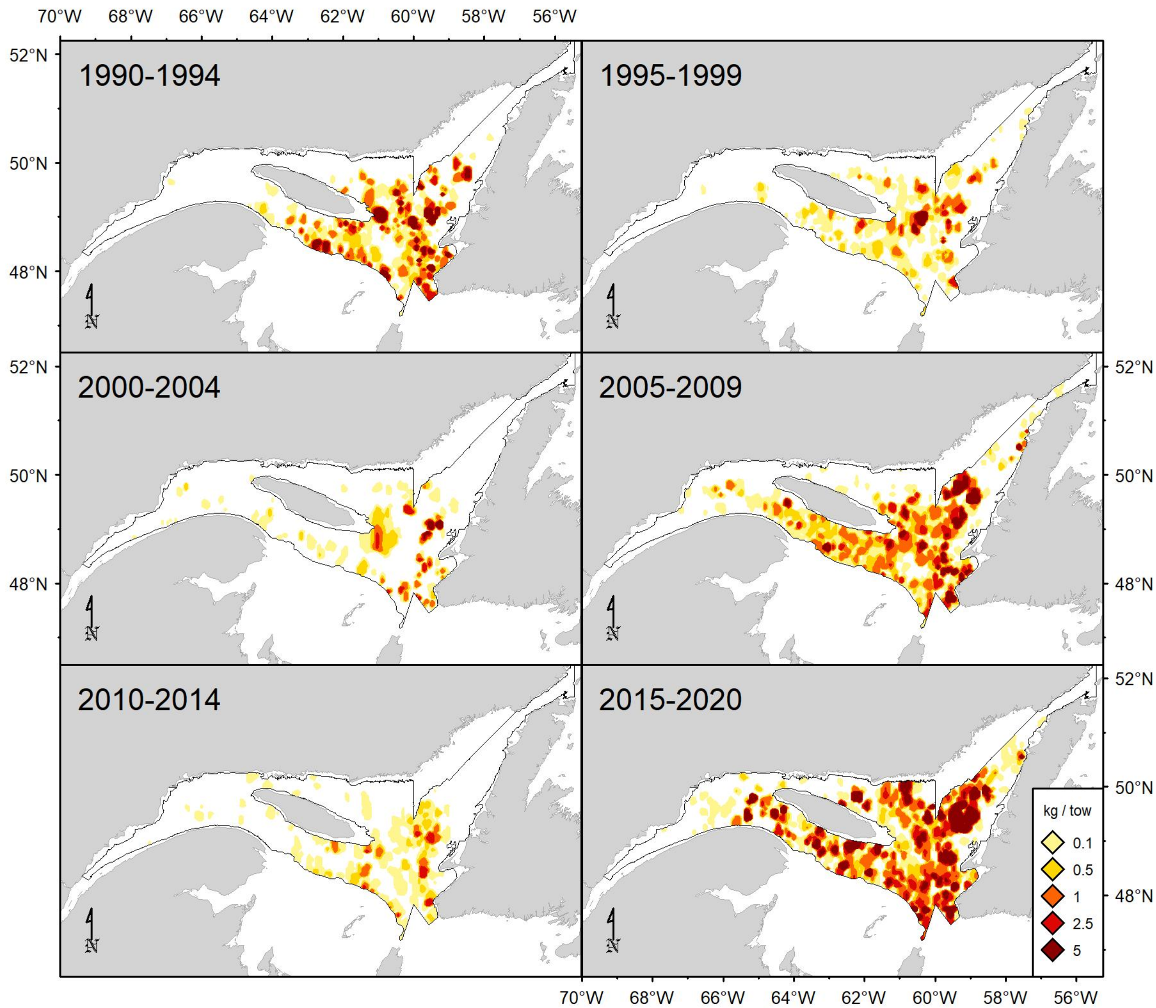


Figure 57. Mantle length frequency distributions (mean number per 15 minutes tow) observed during the survey for northern shortfin squid in 4RST.

Northern shortfin squid



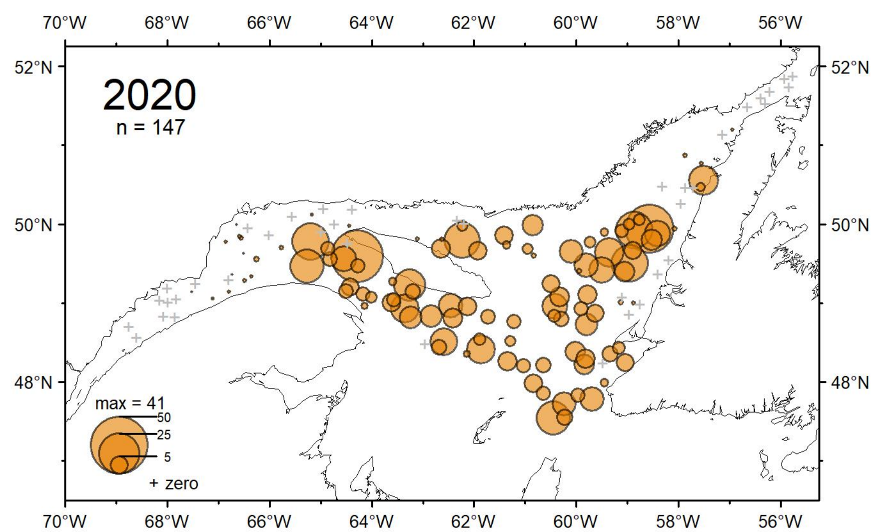


Figure 58. Northern shortfin squid catch rates (kg/15 minutes tow) distribution.

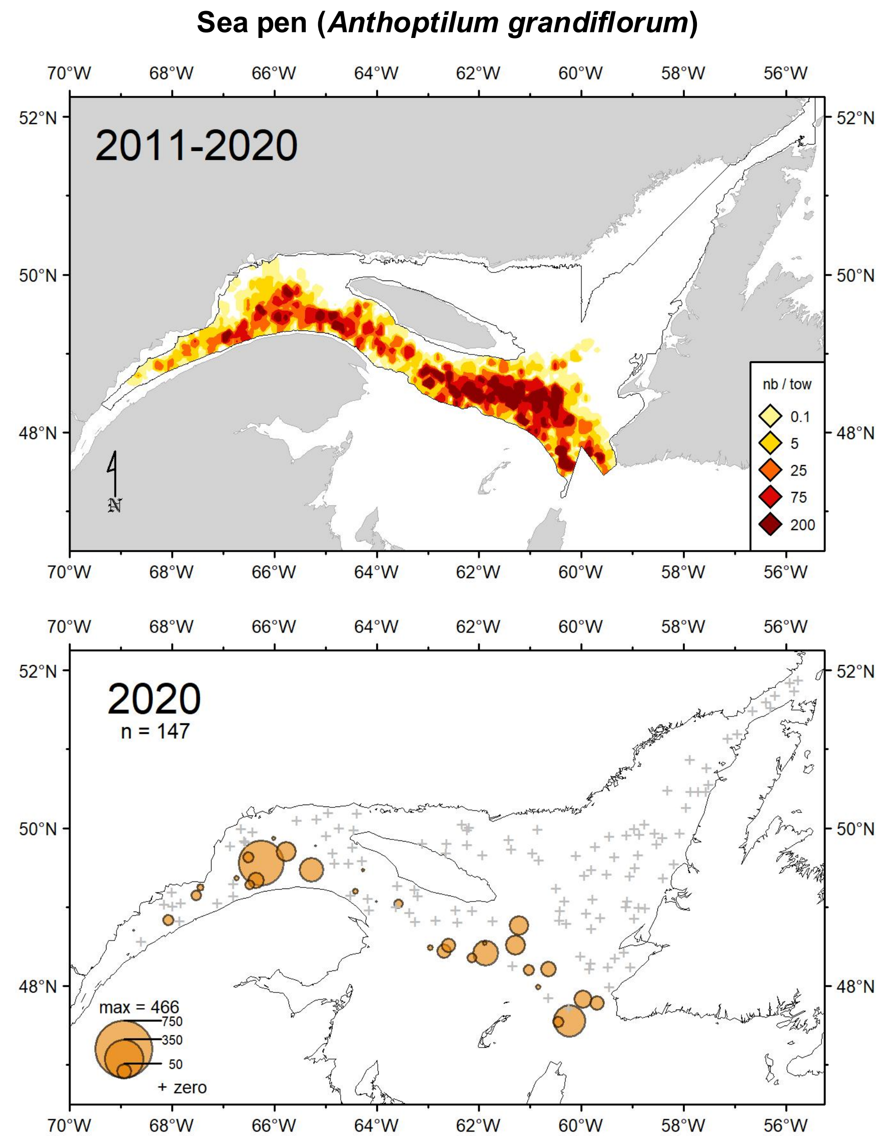


Figure 59. Sea pen (Anthoptilum grandiflorum) catch rates (nb/15 minutes tow) distribution.

Sea pen (*Halipteris finmarchica*)

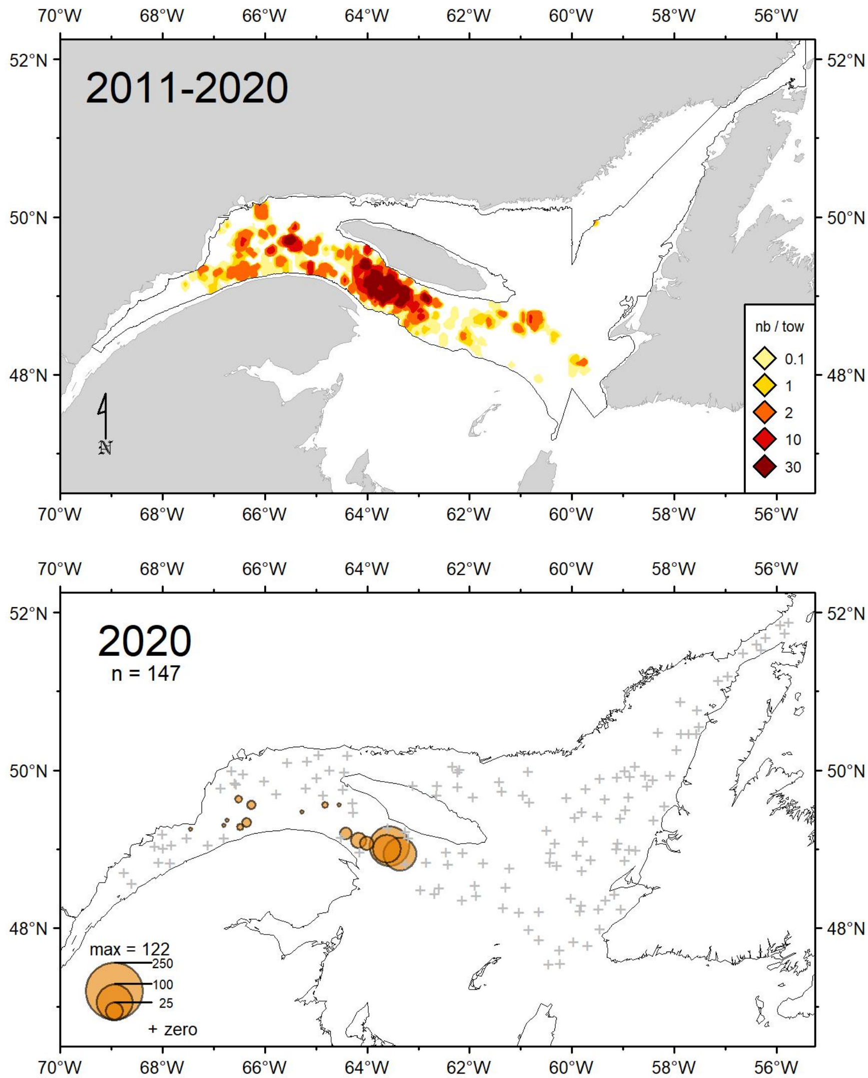


Figure 60. Sea pen (Halipteris finmarchica) catch rates (nb/15 minutes tow) distribution.

Sea pen (*Pennatula aculeata*)

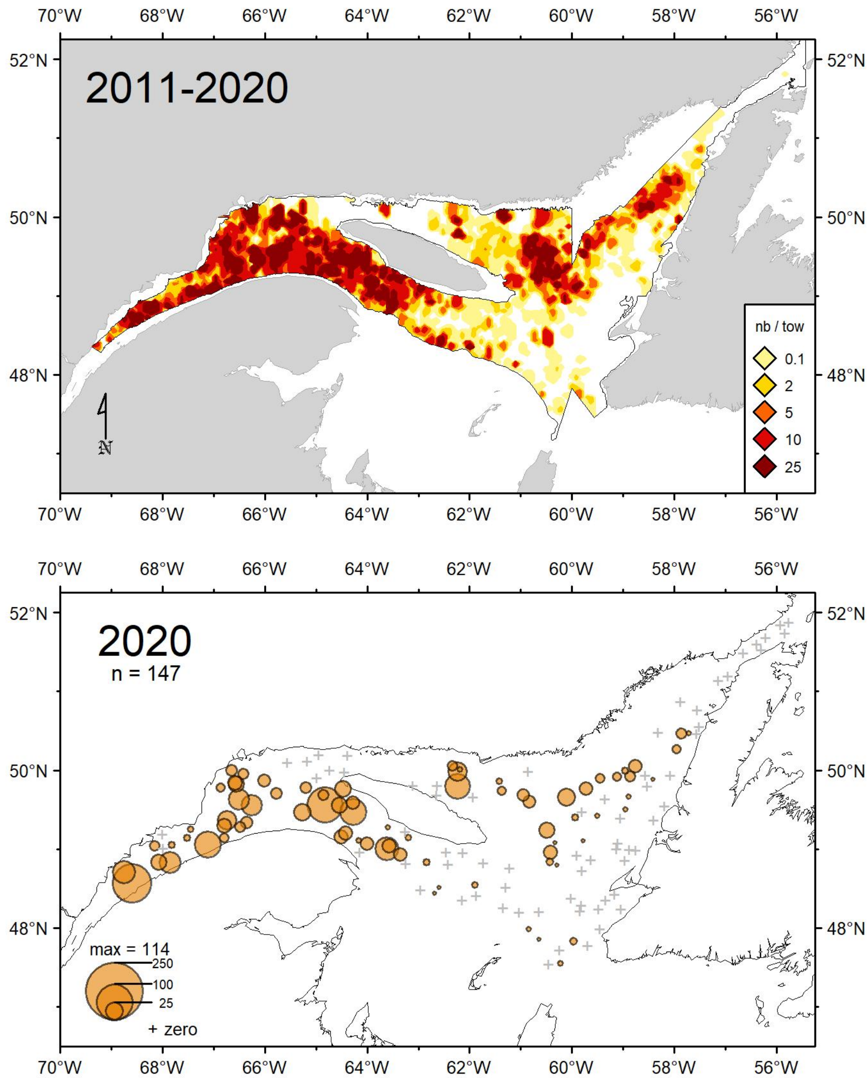


Figure 61. Sea pen (Pennatula aculeate) catch rates (nb/15 minutes tow) distribution.

Sea pen (*Pennatula grandis*)

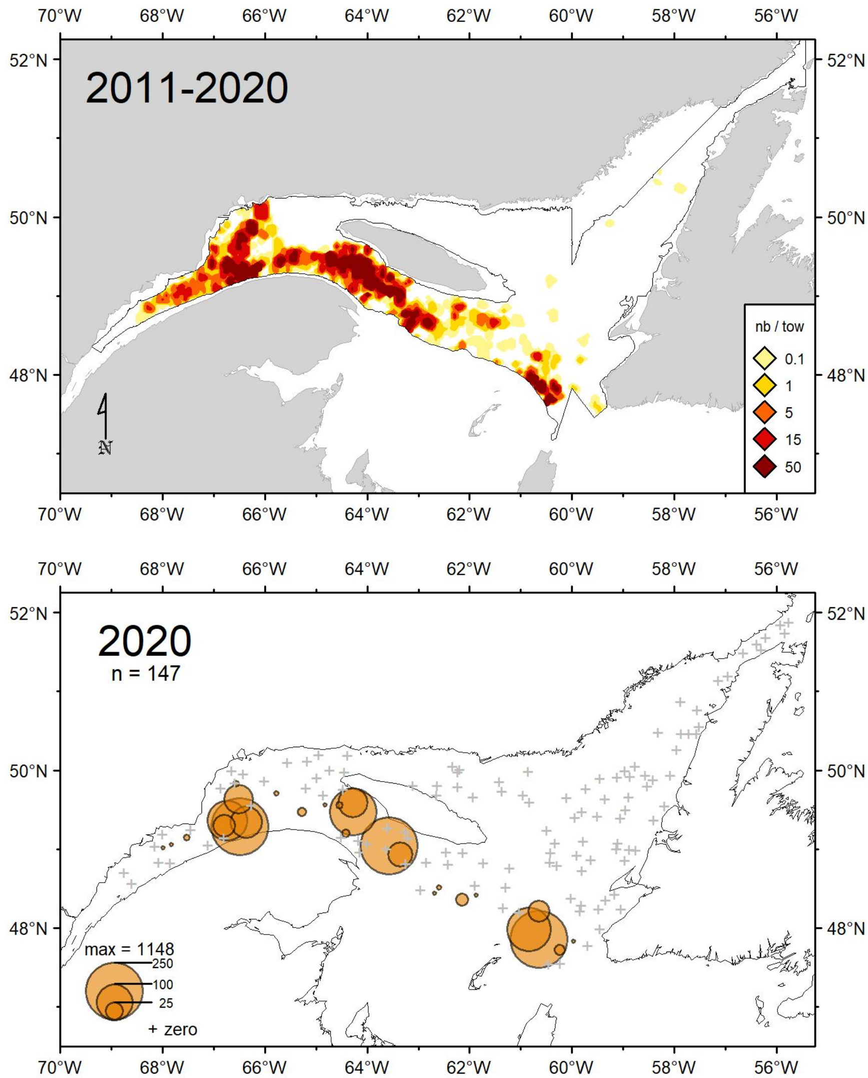


Figure 62. Sea pen (Pennatula grandis) catch rates (nb/15 minutes tow) distribution.

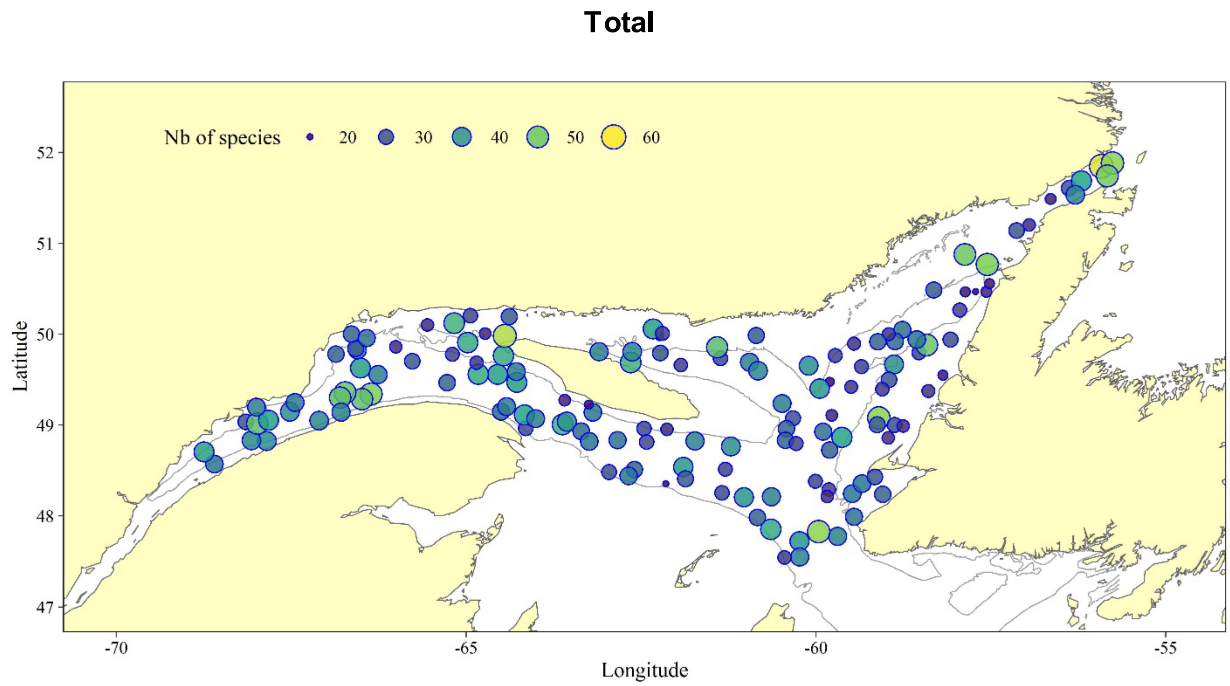


Figure 63. Species richness expressed as the number of species collected by station.

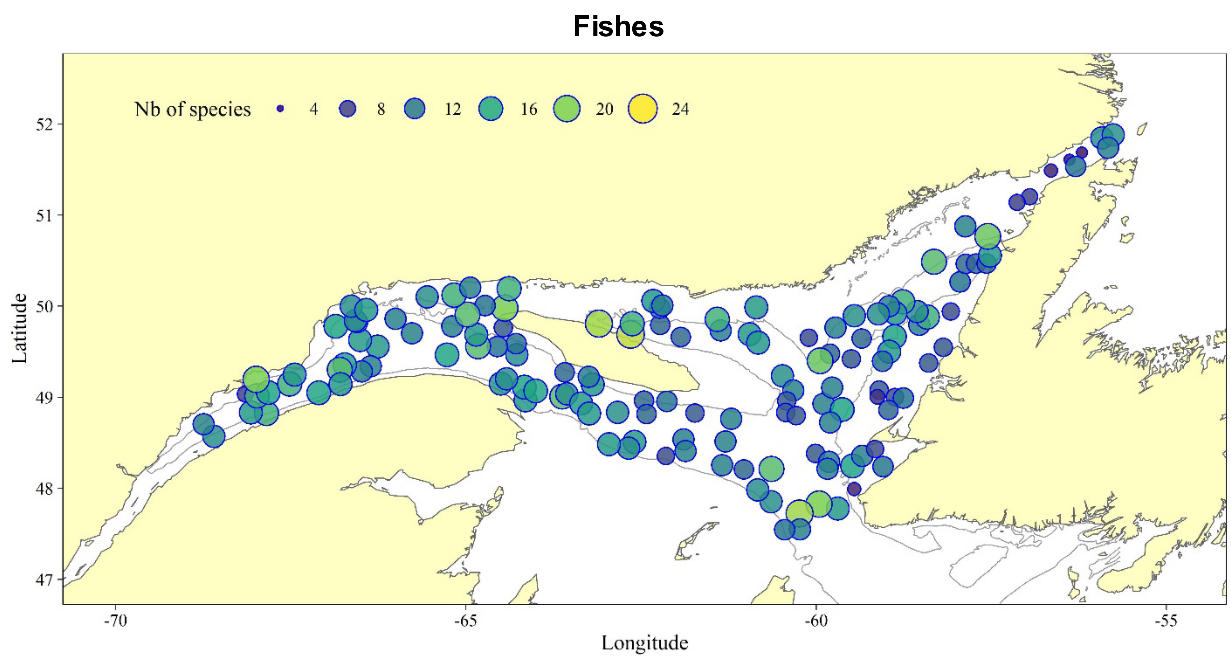


Figure 64. Species richness expressed as the number of species collected by station for the fish grouping.

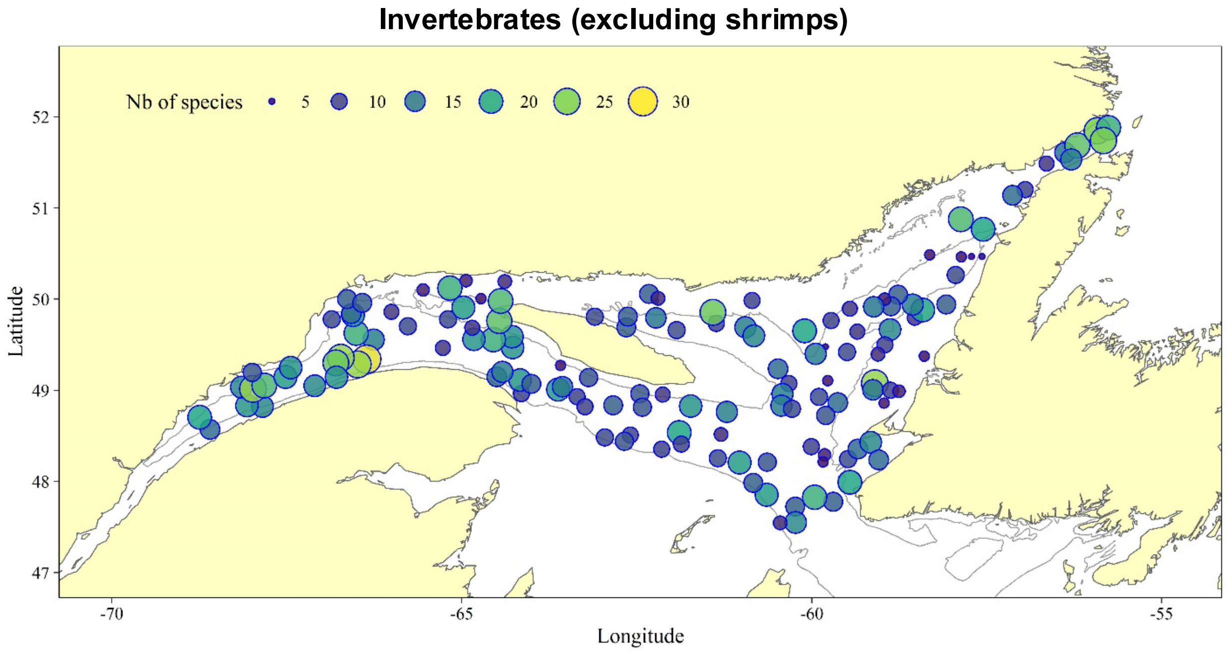


Figure 65. Species richness expressed as the number of species collected by station for the invertebrates grouping excluding the shrimps.

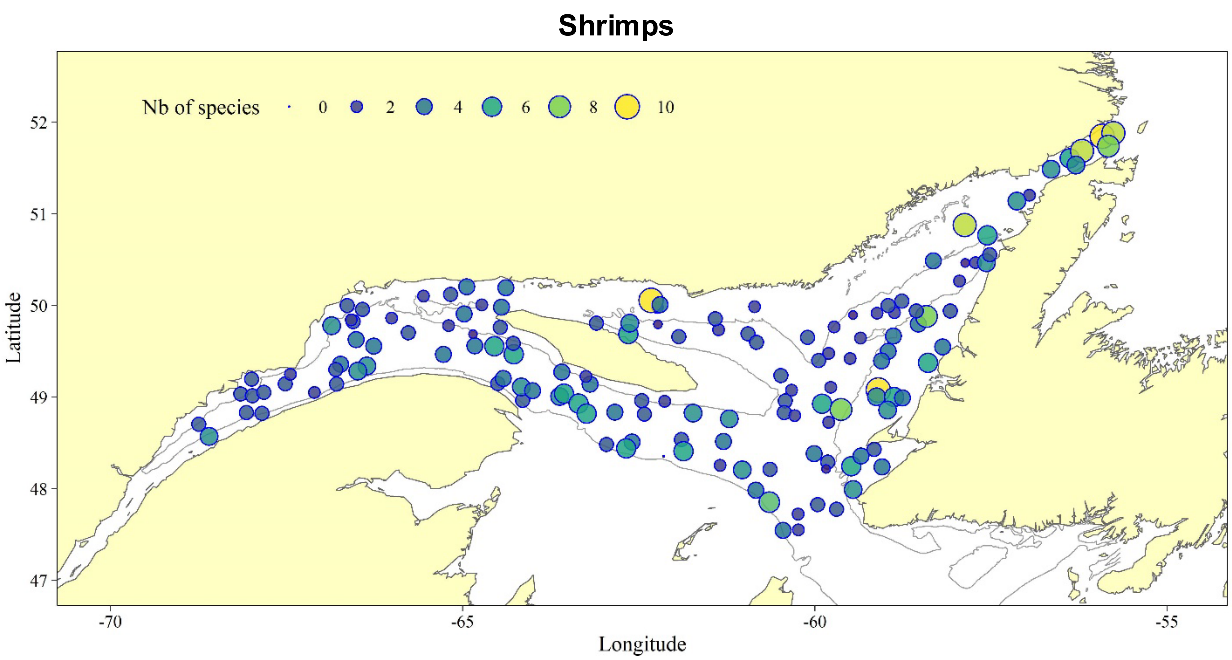


Figure 66. Species richness expressed as the number of species collected by station for the shrimps grouping.

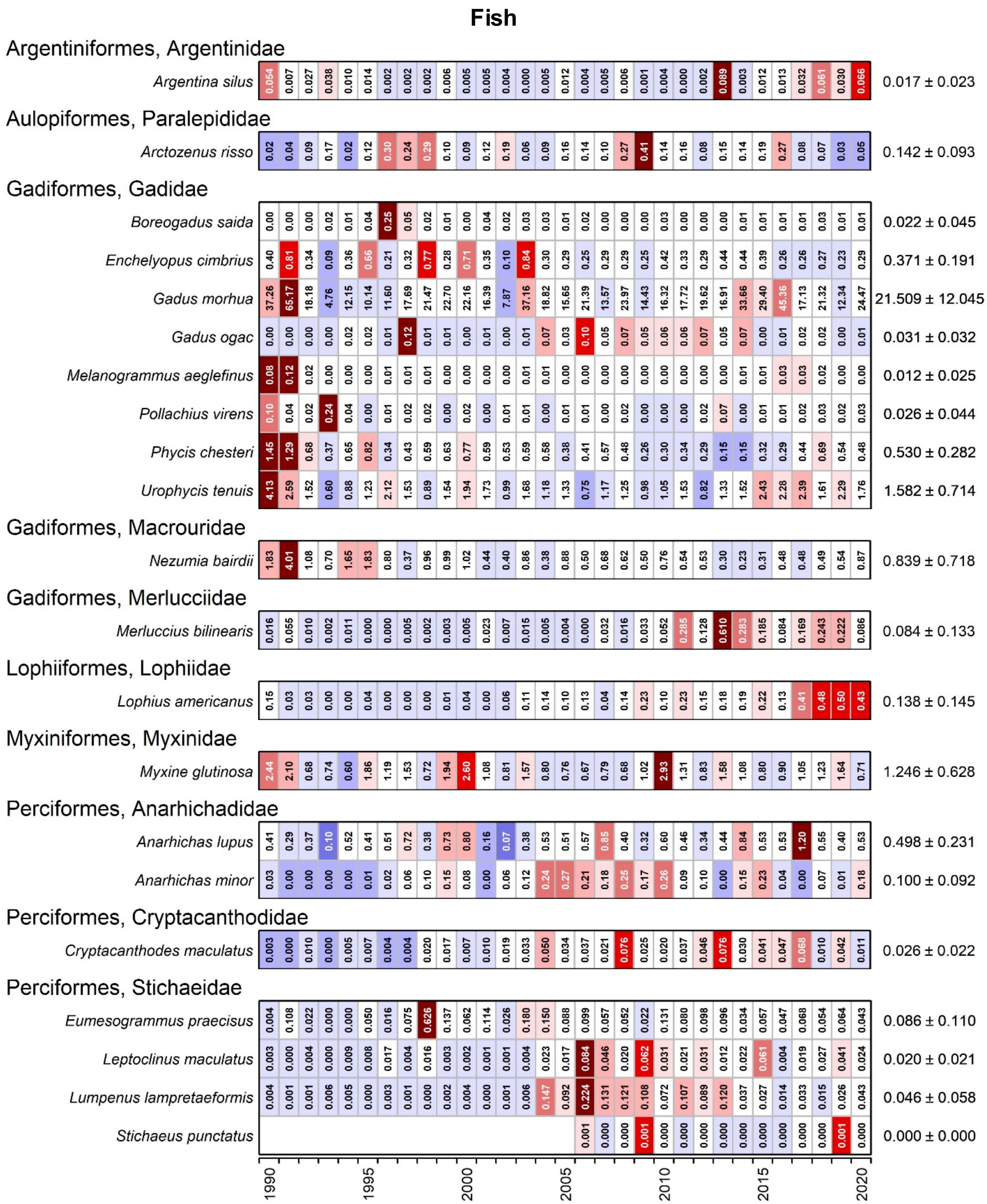


Figure 67. Average weight per 15-minute tow during the fish taxa survey. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

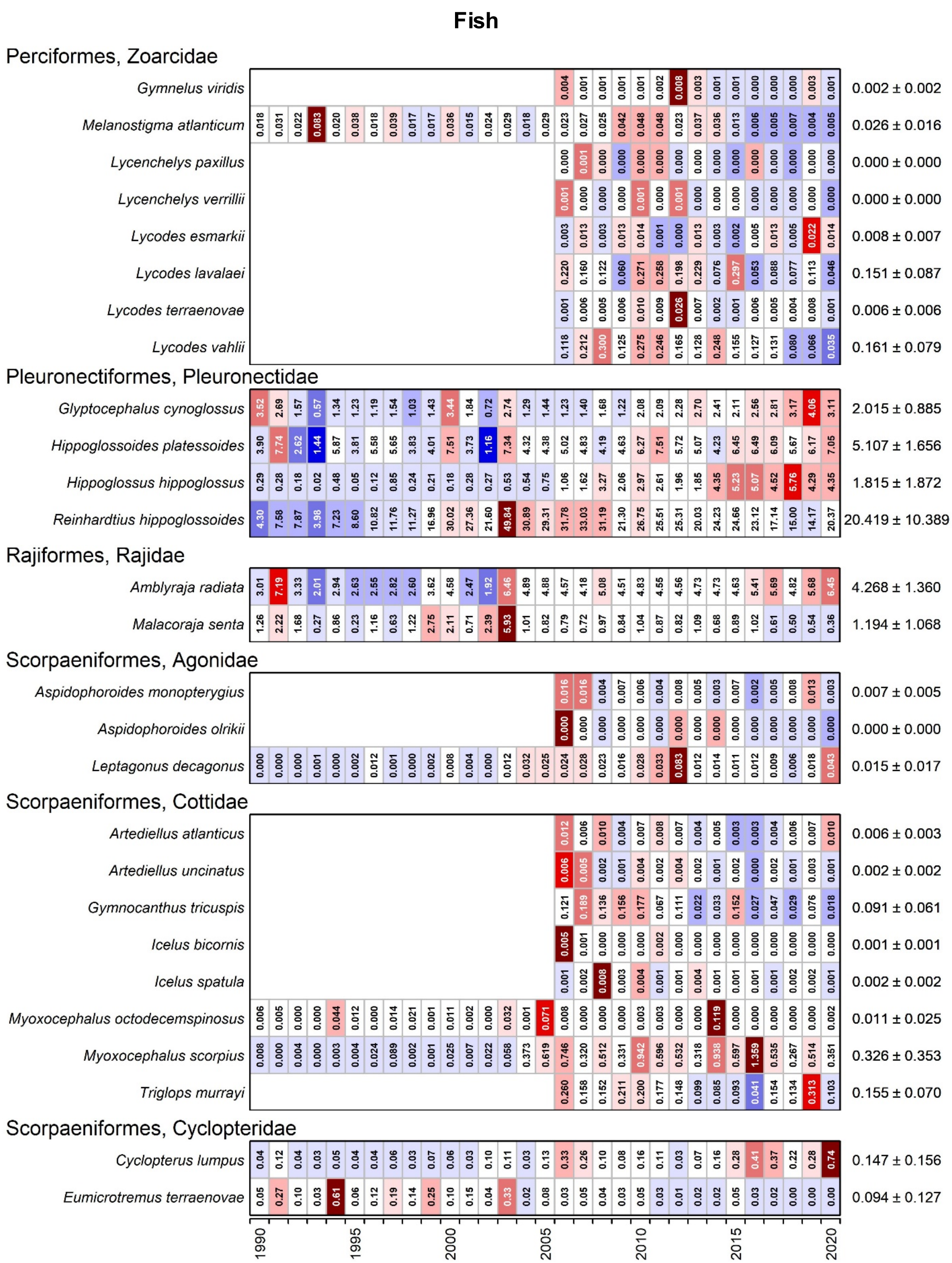


Figure 67. Continued.

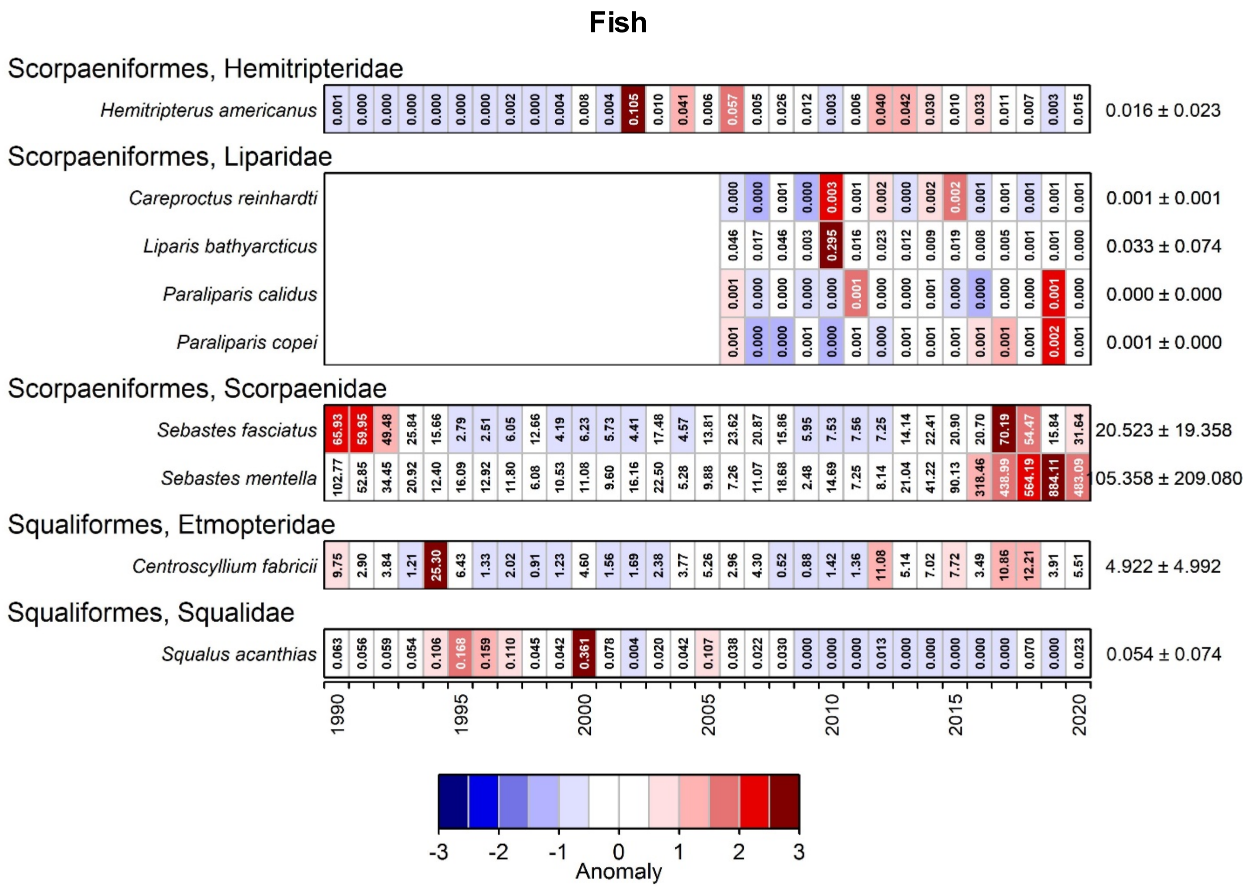


Figure 67. Continued.

Invertebrates

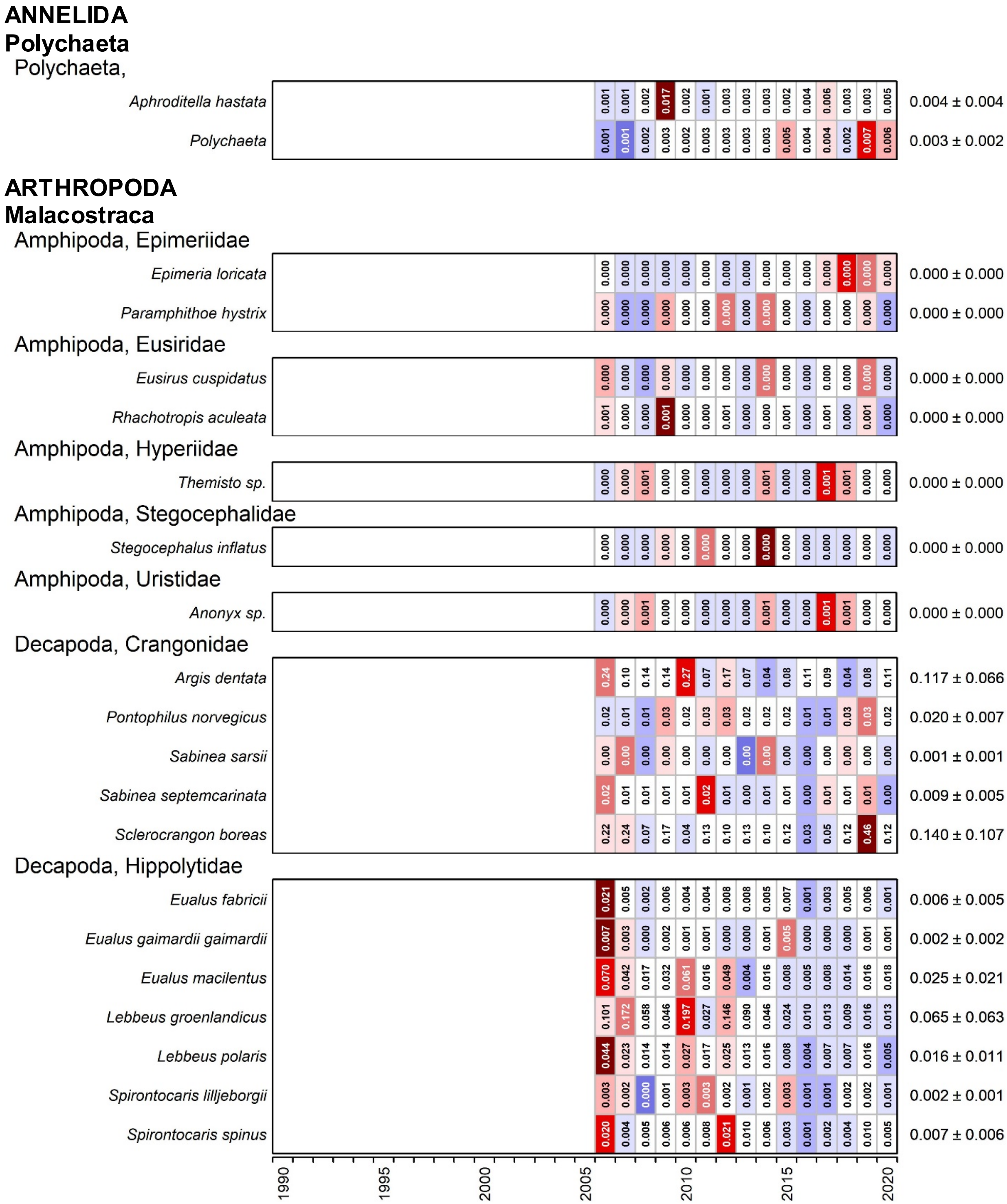


Figure 68. Average weight per 15-minute tow during the invertebrates. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

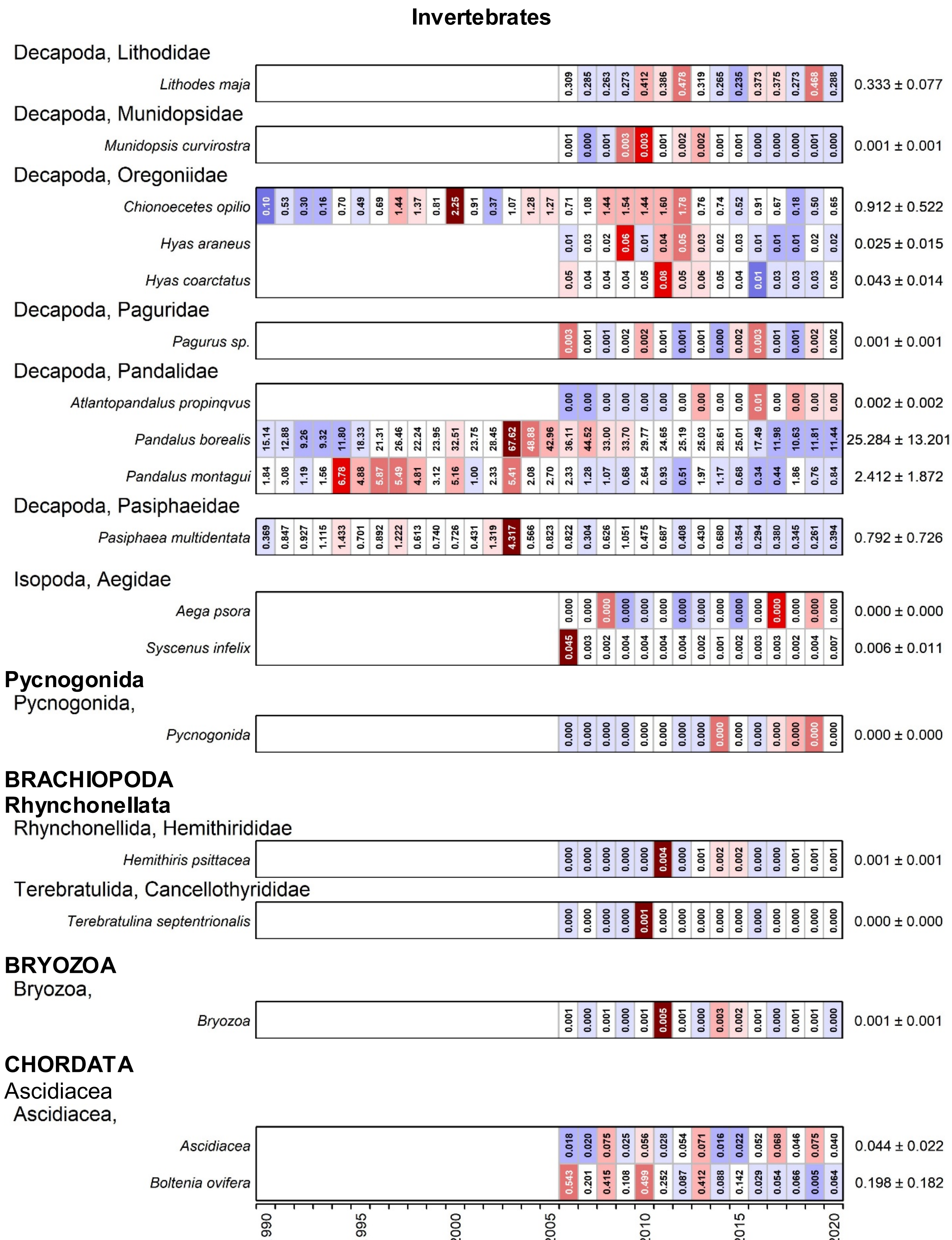


Figure 68. Continued.

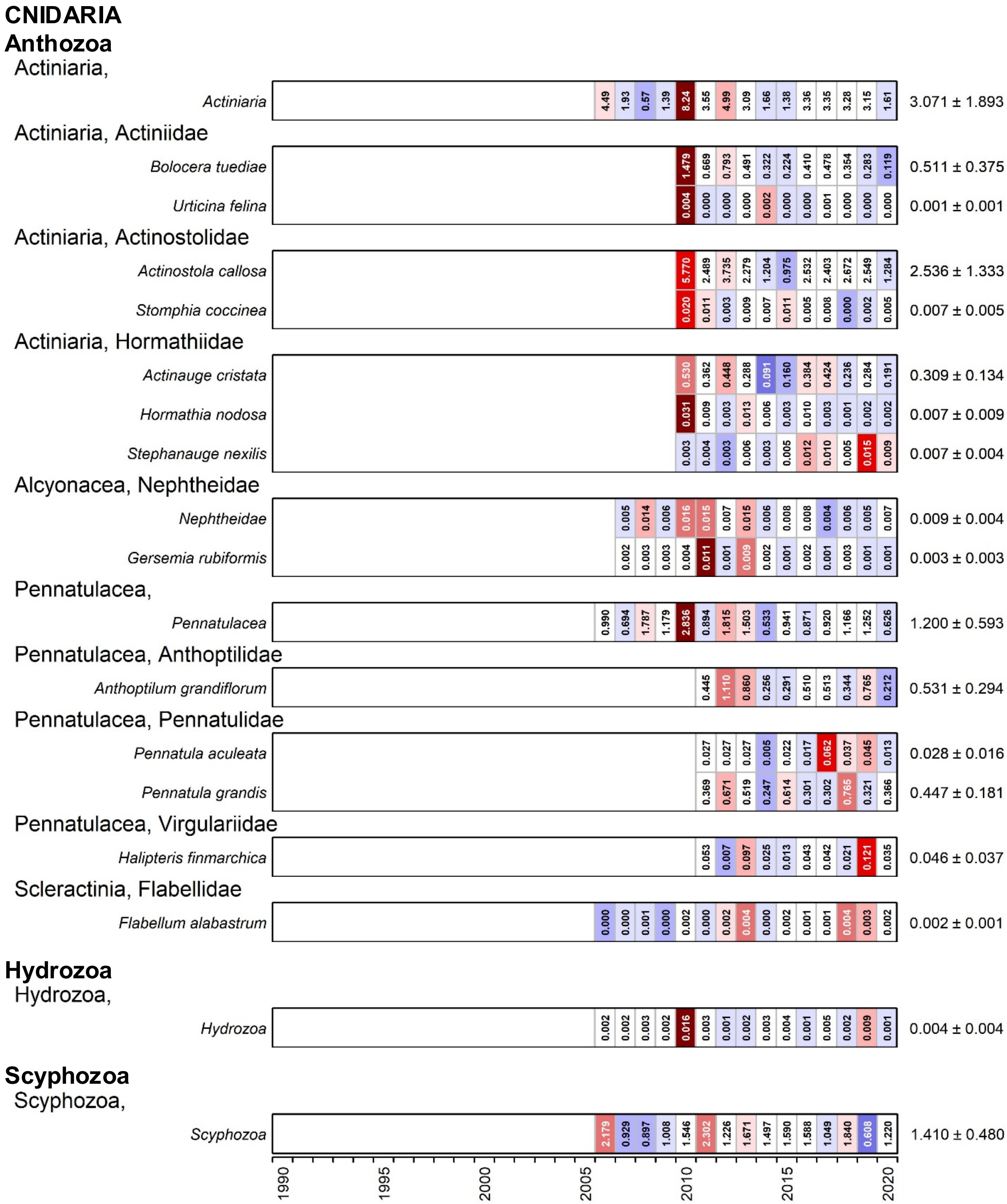


Figure 68. Continued.

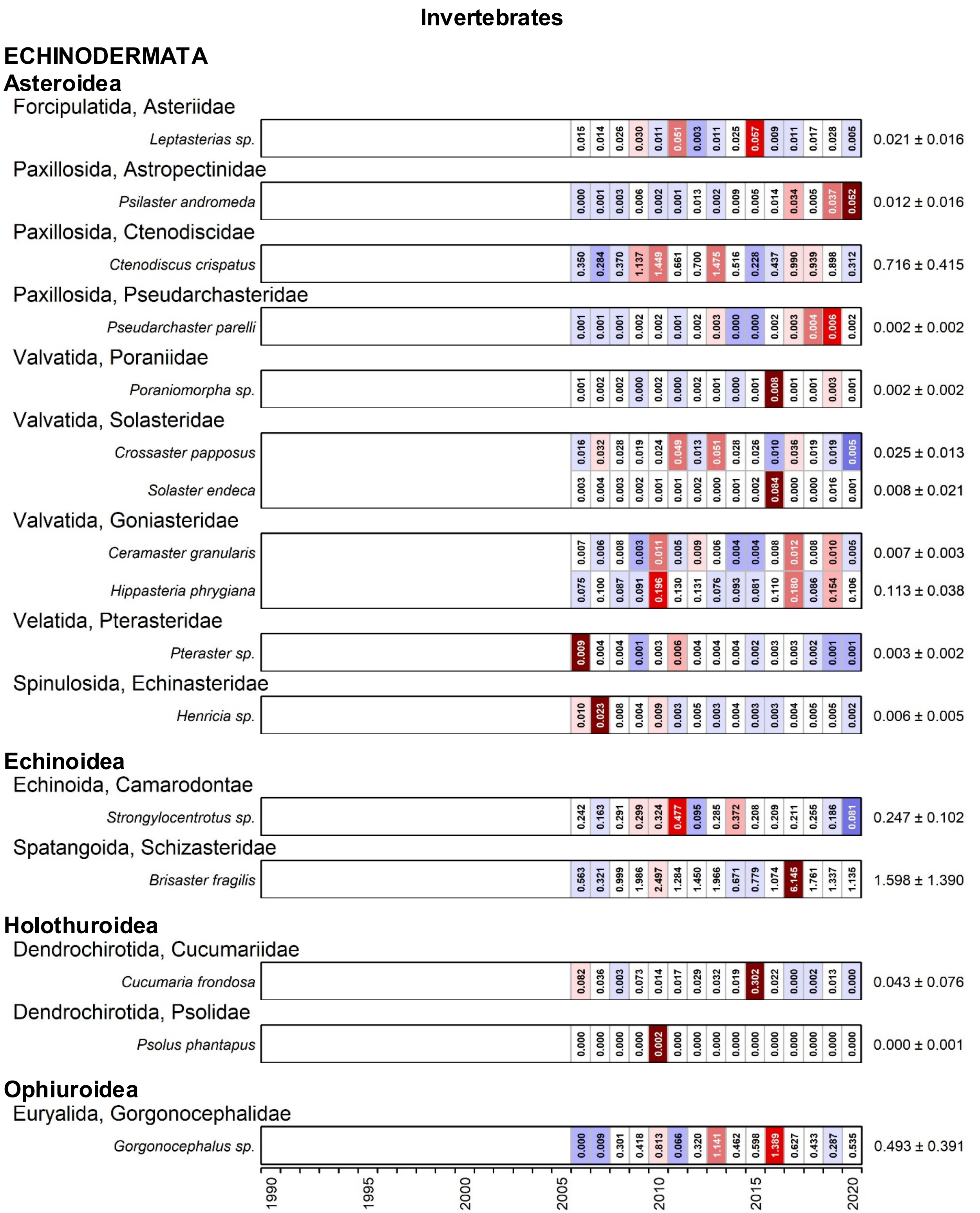


Figure 68. Continued.

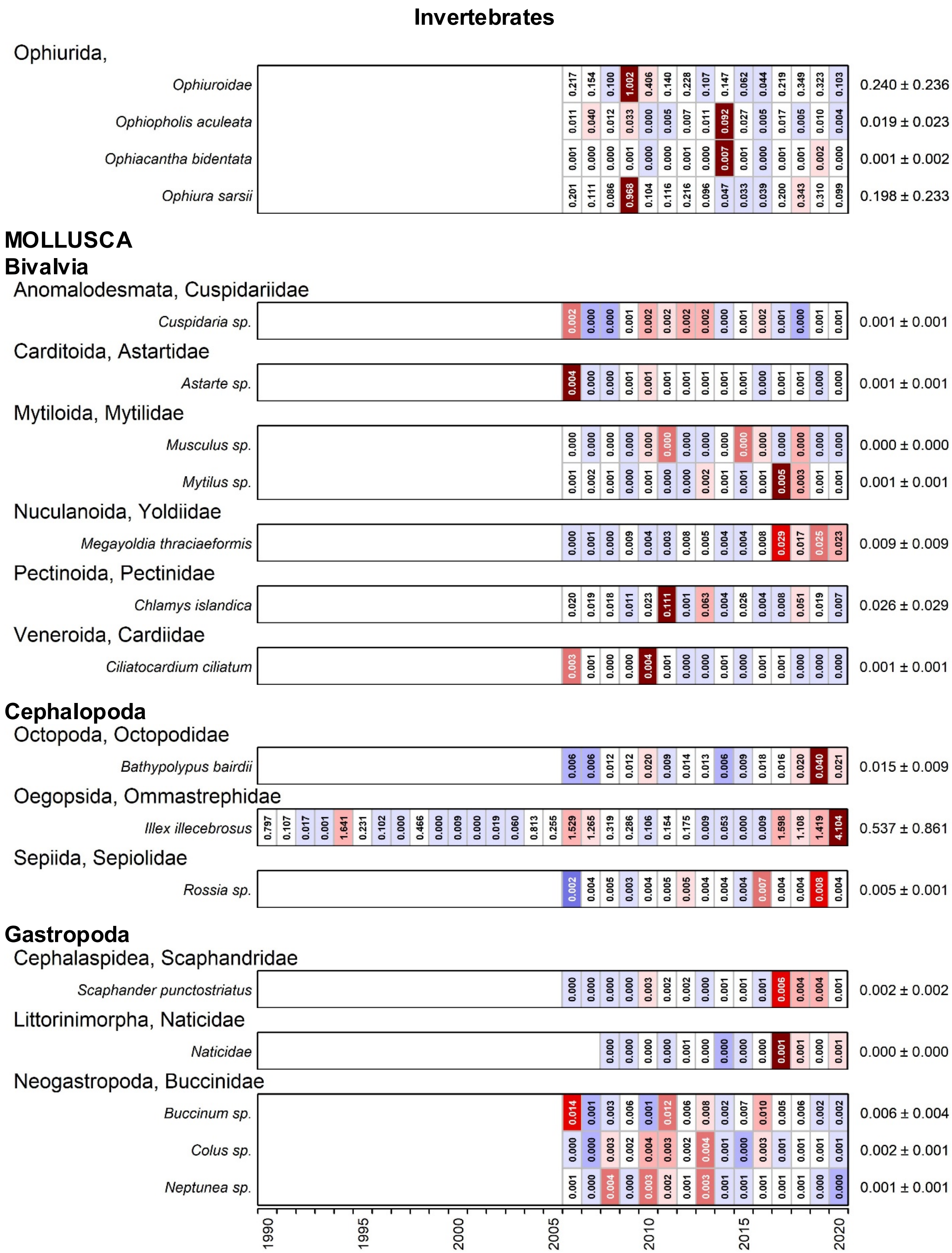


Figure 68. Continued.

Invertebrates

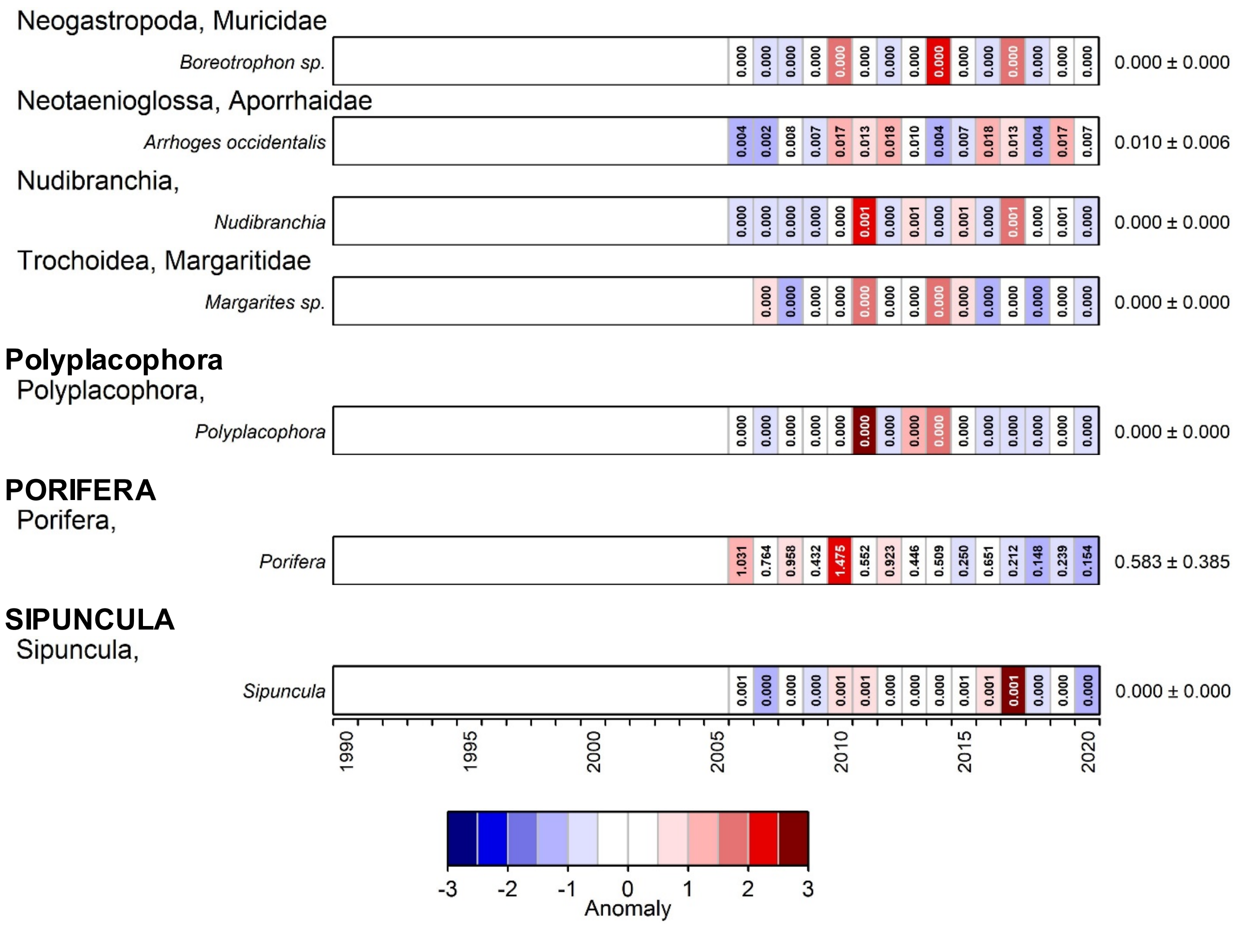


Figure 68. Continued.

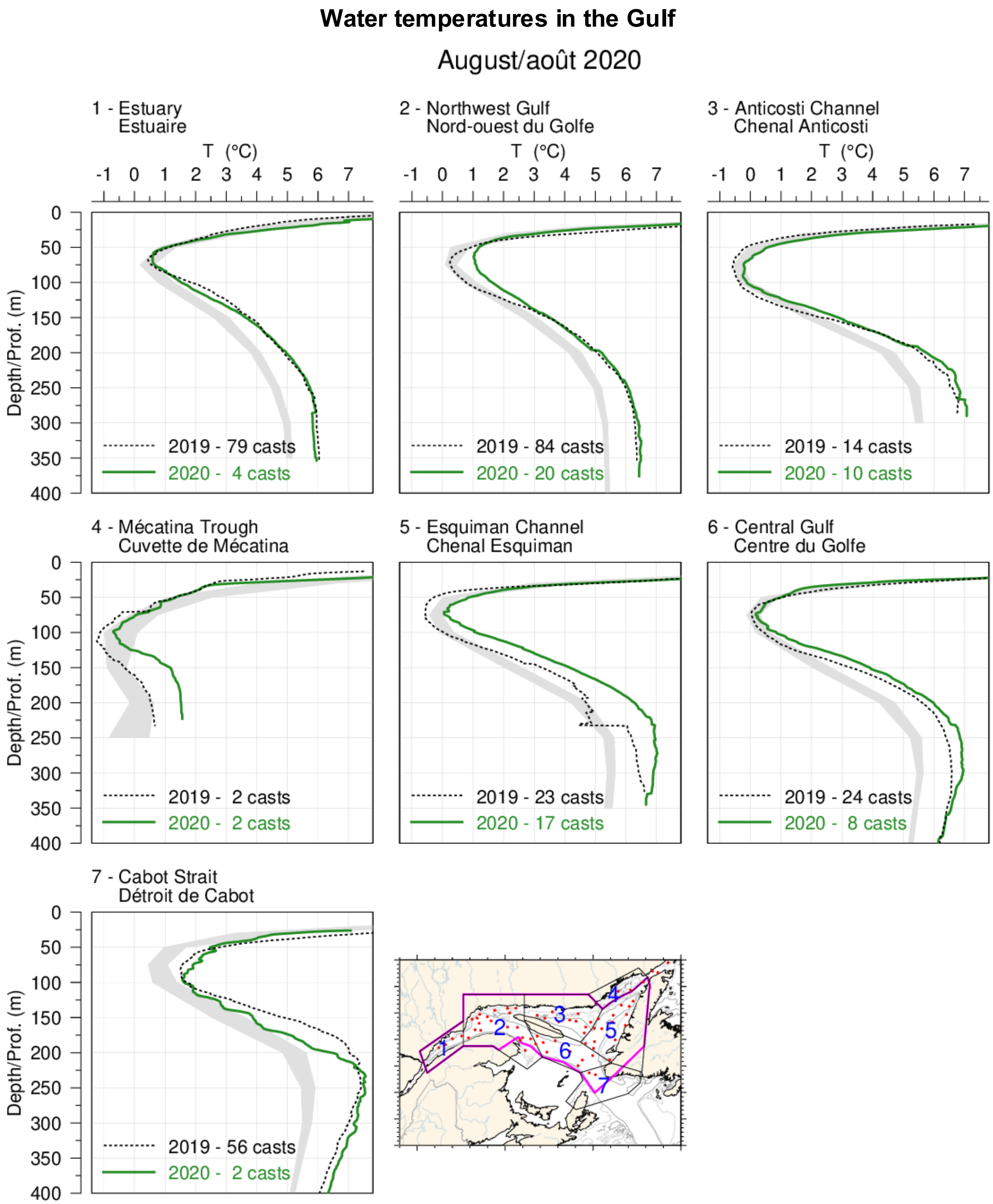


Figure 69. Mean temperature profiles observed in each region of the Gulf during August 2020. The shaded area represents the 1981–2010 climatological monthly mean ± 0.5 SD for August. Mean profiles for August and September 2019 are also shown for comparison. The violet outline on the map shows the area over which sea surface temperature is averaged for figure 70.

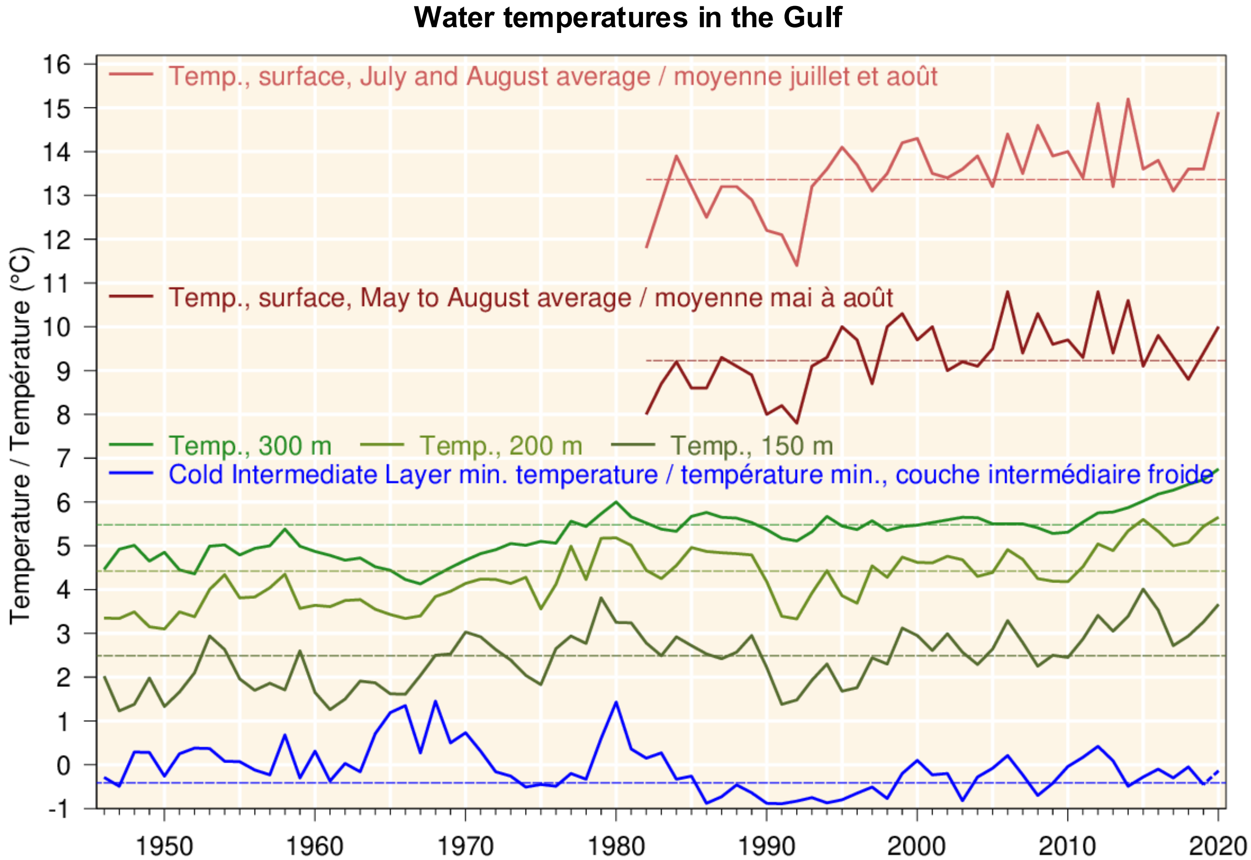


Figure 70. Water temperatures in the Gulf. Sea-surface temperature averaged over the Estuary and the northern Gulf (see violet outline on map of figure 69) for July–August and May-August (1982–2020) (red lines). Layer-averaged temperature for the Gulf of St. Lawrence at 150, 200 and 300 m (green lines). Cold intermediate layer minimum temperature index in the Gulf of St. Lawrence adjusted to July 15, with 2020 value estimated only from August survey data (blue line).

APPENDICES

Appendix 1. Number of successful stations per stratum for the DFO survey.

Stratum	NAFO	Surface (km^2)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
401	4T	545	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	2	2	3	2	2	2	2	1
402	4T	909	3	5	5	3	3	1	3	2	3	5	3	3	3	2	0	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2
403	4T	1190	3	3	3	3	3	3	10	10	3	5	3	3	3	3	6	4	3	3	3	3	3	3	3	2	2	3	2	2	1	2	2
404	4T	792	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	3	2	3	2	2	2	2	2
405	4T	1478	3	3	3	3	3	3	3	2	4	4	4	3	3	3	2	9	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2
406	4T	2579	5	3	3	3	3	3	5	5	3	5	3	4	5	3	5	6	4	4	4	3	3	3	4	3	3	4	4	4	3	3	4
407	4T	2336	5	3	3	3	3	3	3	3	2	3	3	3	3	5	3	5	3	3	3	3	0	3	3	2	4	4	2	3	4	3	3
408	4T	2734	4	5	5	3	2	3	3	2	5	5	4	3	3	3	2	11	4	4	4	4	3	3	4	3	4	4	2	4	3	2	2
409	4T	909	3	3	3	3	0	3	4	3	3	4	4	4	3	3	3	4	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2
410	4T	1818	2	3	3	3	4	6	10	6	5	4	4	4	5	3	3	6	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3
411	4T	1859	3	3	3	3	4	7	9	7	6	9	5	9	4	3	5	8	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3
412	4T	1283	3	3	3	3	4	5	3	3	3	4	4	4	3	3	2	5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
413	4T	731	3	4	3	3	0	3	3	4	3	4	4	4	3	3	1	5	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1
414	4T	388	3	2	3	3	1	3	3	3	3	4	4	4	3	3	3	6	3	3	2	1	3	3	2	3	2	2	2	0	2	1	0
801	4R	1214	3	3	3	4	3	3	3	3	4	5	5	5	2	3	3	4	3	3	3	3	2	3	3	3	3	3	2	3	3	3	2
802	4R	1369	3	3	3	3	3	3	3	3	3	3	3	3	2	8	3	8	2	3	3	3	0	3	3	3	3	3	2	3	3	3	2
803	4S	6976	14	3	2	4	3	3	3	3	4	5	3	4	6	2	1	14	6	8	8	7	3	6	7	3	10	8	5	8	8	4	4
804	4S	2490	5	4	3	3	4	3	3	3	3	3	3	6	3	2	3	10	3	3	3	3	3	3	3	3	4	4	4	4	3	3	3
805	4S	5762	14	7	4	4	6	4	11	8	4	5	5	5	12	8	4	10	8	7	7	6	4	5	7	5	7	7	9	7	5	6	6
806	4S	2127	4	4	3	3	3	3	3	3	3	3	3	3	3	3	5	4	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
807	4S	2370	3	12	11	10	5	5	4	4	3	3	4	3	2	1	0	7	3	3	3	3	3	2	3	3	4	4	4	4	3	2	3
808	4S	2428	4	7	6	4	5	4	3	3	2	4	3	3	3	3	0	3	3	3	3	3	2	3	3	2	4	4	4	4	4	0	2
809	4R	1547	3	9	7	6	4	3	3	3	3	3	3	3	3	3	1	5	3	3	3	3	3	3	2	3	3	3	4	3	3	0	3
810	4R	765	3	4	5	4	3	3	3	3	4	4	4	4	6	5	3	8	3	3	4	3	0	3	3	2	3	2	2	2	2	1	1
811	4R	1506	3	4	4	4	5	3	8	6	3	3	3	3	3	3	3	7	3	3	3	2	2	2	3	2	2	2	2	2	2	0	2
812	4R	4648	7	9	8	11	4	3	3	3	3	3	3	3	3	3	4	5	5	4	5	4	5	3	5	3	8	7	6	6	5	6	5
813	4R	3958	6	6	5	9	3	4	6	5	7	4	6	8	2	5	3	9	5	3	5	3	4	4	6	3	6	6	4	3	5	5	6
814	4S	1029	3	4	4	4	3	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
815	4S	4407	9	15	11	8	5	4	3	3	8	9	9	2	6	3	3	14	5	5	6	5	5	3	6	4	6	7	6	6	5	6	4
816	4S	5032	9	11	9	9	6	6	17	17	20	21	21	1	6	4	4	11	7	7	7	6	4	4	3	6	6	8	7	7	5	6	4
817	4S	3646	7	18	11	7	9	10	9	5	11	17	13	14	8	5	2	7	5	5	4	5	3	3	4	4	5	4	6	6	5	5	6
818	4S	2774	4	7	5	4	3	3	3	4	4	4	4	5	7	5	1	6	4	4	2	4	3	4	3	3	4	5	4	5	4	4	5
819	4S	1441	3	7	9	5	4	5	3	2	3	3	4	1	1	3	0	8	2	3	3	2	3	3	3	3	2	2	2	2	2	1	2
820	4R	1358	3	3	3	3	3	3	7	5	6	5	5	3	2	3	3	14	3	3	3	3	0	2	3	3	3	3	2	3	3	0	2
821	4R	1272	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	7	3	3	3	3	2	4	3	3	3	2	2	3	3	0	2
822	4R	3245	6	4	3	2	3	3	6	4	10	8	10	9	3	3	3	8	4	4	4	3	4	2	4	2	5	3	4	2	3	4	5
823	4R	556	3	3	3	3	2	3	2	3	1	3	2	3	2	5	2	10	3	3	3	3	2	3	3	3	3	3	2	2	3	3	2
824	4R	837	3	1	3	1	3	3	3	3	3	3	2	3	2	2	3	6	3	3	3	3	2	3	3	2	2	2	1	2	2	2	2
827	4S	3231	0	1	1	1	3	3	0	2	3	1	3	0	2	2	3	6	4	4	3	3	3	2	3	2	2	3	3	3	4	0	2
828	4S	2435	4	1	2	2	3	3	3	3	3	1	0	1	0	3	3	1	3	3	3	3	3	2	2	2	2	2	2	4	4	3	2
829	4S	2692	3	2	3	3	3	3	3	0	3	3	2	0	2	1	0	8	4	4	3	2	3	2	2	3	2	4	3	2	3	1	2
830	4S	1917	3	3	4	3	3	3	2	2	3	3	3	2	1	1	0	6	3	3	3	3	3	3	2	3	2	4	4	3	3	3	2
831	4S	1204	3	0	2	3	3	3	3	2	3	4	3	3	1	3	3	4	3	3	3	3	3	3	3	2	2	2	2	2	2	1	2
832	4S	3962	4	12	11	7	7	9	8	5	3	3	3	3	2	3	4	8	4	5	5	3	4	3	6	4	4	4	3	5	5	4	5
833	4S	559	3	1	3	3	3	3	3	3	3	3	3	0	3	3	2	6	3	3	3	3	3	3	3	1	2	2	2	2	2	2	1
835	4R	2641	0	6	7	6	3	3	3	3	6	5	6	5	6	3	3	8	5	5	5	4	0	4	5	2	4	3	3	4	4	0	3
836	4R	3149	0	7	8	6	3	3	3	3	3	3	3	3	3	2	4	10	5	3	5	4	3	4	4	3	5	5	2	3	4	3	5
837	4R	2668	0	5	6	3	2	3	4	4	3	3	3	3	5	5	2	4	4	3	5	3	3	2	5	1	4	4	3	3	2	3	3
838	4R	3378	0	9	8	7	5	5	0	0	0	2	0	4	4	0	3	10	6	3	6	0	0	3	5	0	6	4	5	3	5	3	5
839	4S	4390	0	2	5	5	3	2	2	1	2	3	3	0	0	3	2	3	6	5	4	3	3	2	2	3	2	3	2	2	2	1	1
840	4R	765	0	3	3	1	1	0	0	0	0	0	0	2	0	0	0	5	3	0	3	0	0	1	3	0	2	3	2	0	1	0	2
841	4S	816	0	0	1	3	3	3	3	0	2	1	2	3	2	3	3	3	3	3	2	3	3	3	2	3	2	2	2	2	1	2	1
Total		116115	191	250	239	214	175	182	217	185	204	224	209	183	171	163	133	354	192	183	189	164	132	156	178	141	177	182	159	163	160	124	143
851	4T	456	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	2	2	2	2	2	1	1
852	4T	427	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	2	3	2	2	2	1	2	2	1
854	4T	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	2	2	2	2	2	2	2	2	0	1
855	4T	928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	3	2	3	3	2	2	2	2	2	1	1

Appendix 2. Occurrences and total catches, in weight and number, by taxon during the 2020 survey (147 successful tows). Taxonomic codes (STRAP) follow Miller and Chabot (2014), with scientific name updates by the World Marine Species Registry (WoRMS 2018, http://www.marinespecies.org).

Vertebrates

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
90	*Amblyraja radiata*	Raie épineuse	Thorny Skate	122	1144.7	1768
696	*Ammodytes* sp.	Lançons	Sand Lances	6	0.1	9
700	*Anarhichas lupus*	Loup atlantique	Atlantic Wolffish	24	81.5	205
701	*Anarhichas minor*	Loup tacheté	Spotted Wolffish	6	32.3	7
718	*Anisarchus medius*	Lompénie naine	Stout Eelblenny	1	0.1	17
320	*Arctozenus risso*	Lussion blanc	White Barracudina	72	7.1	398
193	*Argentina silus*	Grande argentine	Atlantic Argentine	18	11.7	173
811	*Artediellus atlanticus*	Hameçon atlantique	Atlantic Hookear Sculpin	19	1.2	152
810	*Artediellus* sp.	Hameçons	Hookear Sculpins	5	0.4	95
812	*Artediellus uncinatus*	Hameçon neigeux	Arctic Hookear Sculpin	6	0.4	76
838	*Aspidophoroides monopterygius*	Poisson-alligator atlantique	Alligatorfish	26	0.3	101
837	*Aspidophoroides olrikii*	Poisson-alligator arctique	Arctic Alligatorfish	2	0	3
102	*Bathyraja spinicauda*	Raie à queue épineuse	Spinytail Skate	1	9.3	1
290	*Benthosema glaciale*	Lanterne glacière	Glacier Lanternfish	4	0	9
451	*Boreogadus saida*	Saïda franc	Arctic Cod	28	3.8	306
865	*Careproctus reinhardti*	Petite limace de mer	Sea Tadpole	9	0.2	9
27	*Centroscyllium fabricii*	Aiguillat noir	Black Dogfish	23	785.1	973
150	*Clupea harengus*	Hareng atlantique	Atlantic Herring	54	1586.2	9973
721	*Cryptacanthodes maculatus*	Terrassier tacheté	Wrymouth	4	1.1	12
982	*Cryptopsaras couesii*	Petit pêcheur abyssal	Triplewart Seadevil	1	0.2	1
849	*Cyclopterus lumpus*	Grosse poule de mer	Lumpfish	33	63.7	66
461	*Enchelyopus cimbrius*	Motelle à quatre barbillons	Fourbeard Rockling	93	43.7	1264
711	*Eumesogrammus praecisus*	Quatre-lignes atlantique	Fourline Snakeblenny	19	4.1	159
847	*Eumicrotremus terraenovae*	Petite poule Terre-Neuve	Newfoundland Spiny Lumpsucker	18	6	282
438	*Gadus morhua*	Morue franche	Atlantic Cod	68	3408.6	10065
439	*Gadus ogac*	Ogac, morue ogac	Greenland Cod	3	2.4	6
426	*Gasterosteus aculeatus aculeatus*	Épinoche à trois épines	Threespine Stickleback	4	0.1	23
890	*Glyptocephalus cynoglossus*	Plie grise	Witch Flounder	116	585.9	3408
205	Gonostomatidae	Cyclothones	Bristlemouths	2	<0.1	2
746	*Gymnelus viridis*	Unernak caméléon	Fish Doctor	4	0.1	10
823	*Gymnocanthus tricuspis*	Tricorne arctique	Arctic Staghorn Sculpin	18	6.3	106
809	*Hemitripterus americanus*	Hémitriptère atlantique	Sea Sculpin	1	1.4	1

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
889	*Hippoglossoides platessoides*	Plie canadienne	American Plaice	125	1182.1	13292
893	*Hippoglossus hippoglossus*	Flétan atlantique	Atlantic Halibut	37	657.6	66
832	*Icelus spatula*	Icèle spatulée	Spatulate Sculpin	6	0.1	29
836	*Leptagonus decagonus*	Agone atlantique	Atlantic Poacher	21	6.1	351
717	*Leptoclinus maculatus*	Lompénie tachetée	Daubed Shanny	28	2.8	473
891	*Limanda ferruginea*	Limande à queue jaune	Yellowtail Flounder	4	35	183
868	*Liparis bathyarcticus*	Limace nébuleuse	Nebulous Snailfish	12	1.9	44
966	*Lophius americanus*	Baudroie d'Amérique	Monkfish, Goosefish	11	70.6	13
716	*Lumpenus lampretaeformis*	Lompénie-serpent	Snakeblenny	24	5.7	242
750	*Lycenchelys paxillus*	Lycode commune	Common Wolf Eel	1	<0.1	1
752	*Lycenchelys verrillii*	Lycode à tête longue	Wolf Eelpout	1	<0.1	1
727	*Lycodes esmarkii*	Lycode d'Esmark	Esmark's Eelpout	4	1.2	7
728	*Lycodes lavalaei*	Lycode du Labrador	Newfoundland Eelpout	14	7.6	56
726	*Lycodes* sp.	Lycodes	Eelpouts	1	0.2	4
734	*Lycodes terraenovae*	Lycode atlantique	Atlantic Eelpout	2	0.3	2
730	*Lycodes vahlii*	Lycode à carreaux	Vahl's Eelpout	19	4.4	122
91	*Malacoraja senta*	Raie lisse	Smooth Skate	76	51.2	274
187	*Mallotus villosus*	Capelan	Capelin	47	126	12309
745	*Melanostigma atlanticum*	Molasse atlantique	Atlantic Soft Pout	33	0.8	269
449	*Merluccius bilinearis*	Merlu argenté	Silver Hake	39	16.6	99
272	Myctophidae	Poissons-lanterne	Lanternfishes	20	0.8	260
271	Myctophiformes	Poissons des profondeurs	Deepwater Fishes	5	0.1	7
818	*Myoxocephalus aenaeus*	Chaboisseau bronzé	Little Sculpin, Grubby	2	0.7	6
820	*Myoxocephalus octodecemspinosus*	Chaboisseau à dix-huit-épines	Longhorn Sculpin	1	0.2	2
819	*Myoxocephalus scorpius*	Chaboisseau à épines courtes	Shorthorn Sculpin	18	43.9	147
12	*Myxine glutinosa*	Myxine du nord	Northern Hagfish	79	99.4	1568
368	*Nemichthys scolopaceus*	Avocette ruban	Atlantic Snipe Eel	2	0.1	2
478	*Nezumia bairdii*	Grenadier du grand Banc	Common Grenadier	83	102.3	3227
275	*Notoscopelus kroyeri*	Lanterne-voilière nordique	Kroyer's Lanternfish	4	0.3	12
874	*Paraliparis calidus*	Limace ardente	Lowfin Snailfish	8	0.1	10
856	*Paraliparis copei copei*	Limace à museau noir	Blacksnout Seasnail	4	0.1	14
15	*Petromyzon marinus*	Lamproie marine	Sea Lamprey	1	0.1	1
444	*Phycis chesteri*	Merluche à longues nageoires	Longfin Hake	31	66.5	499
443	*Pollachius virens*	Goberge	Pollock	1	4.8	1
244	*Polymetme thaeocoryla*	Poisson lumineux	Ligthfishes	1	<0.1	1
94	*Rajella fyllae*	Raie ronde	Round Skate	1	<0.1	1
892	*Reinhardtius hippoglossoides*	Flétan du Groenland, turbot	Greeenland Halibut, Turbot	110	3204.1	12980
572	*Scomber scombrus*	Maquereau bleu	Atlantic Mackerel	39	11.3	270

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
398	*Scomberesox saurus saurus*	Balaou	Atlantic Saury	3	1	7
796	*Sebastes fasciatus*	Sébaste acadien	Acadian Redfish	65	4564.1	28064
794	*Sebastes mentella*	Sébaste atlantique	Deepwater Redfish	115	74837.4	439975
24	*Squalus acanthias*	Aiguillat commun	Spiny Dogfish	2	4.8	3
220	Sternoptychidae	Haches	Hatchetfishes	1	<0.1	1
373	*Synaphobranchus kaupii*	Anguille égorgée bécuée	Northern Cutthroat Eel	1	0.2	2
814	*Triglops murrayi*	Faux-trigle armé	Moustache Sculpin	41	16.4	1340
447	*Urophycis tenuis*	Merluche blanche	White Hake	73	289.8	514
	Total	**Vertébrés**	**Vertebrates**		93 207	546 431

Invertebrates

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
1100	-	Invertébrés	Invertebrates	2	<0.1	3
2182	*Actinauge cristata*	Anémone de mer	Anemone	34	28.6	2352
2165	Actiniaria	Actinies et Anémones	Sea Anemones	9	0.7	13
2162	*Actinostola callosa*	Anémones de mer	Anemone	46	214	2336
6771	*Aega psora*	Isopode	Isopod	8	<0.1	10
2676	*Alcyonidium gelatinosum*	Bryozoaire marin	Marine bryozoans	3	0.1	-
3891	*Aldisa zetlandica*	Nudibranche	Nudibranch	4	<0.1	5
6930	Amphipoda	Amphipodes	Amphipods	1	<0.1	1
5675	*Amphitrite cirrata*	Polychète	Terebellid worm	1	<0.1	1
8593	*Amphiura* sp.	Ophiures	Brittle star	6	0.1	521
4219	*Anomia* sp.	Anomies	Jingle shells	3	<0.1	31
7389	*Anonyx* sp.	Gammarides	Gammarids	3	<0.1	8
2218	*Anthoptilum grandiflorum*	Plume de mer	Sea pen	32	24.6	1762
5002	*Aphroditella hastata*	Souris de mer	Sea Mouse	15	0.8	33
6594	*Arcoscalpellum michelottianum*	Balane	Barnacle	4	0.1	4
8138	*Argis dentata*	Crevette verte	Arctic Argid	28	21.3	3875
3418	*Arrhoges occidentalis*	Pied-de-pélican	American Pelicanfoot	16	0.8	135
8742	*Ascidia* sp.	Ascidie	Sea squirts	71	5.9	1571
8680	Ascidiacea	Ascidies, tuniqués sessiles	Ascidians, Sessile Tunicates	19	<0.1	34
1120	*Asconema foliatum*	Éponge	Sponge	2	8.5	-
4231	*Astarte borealis*	Astarte	Boreal Astarte	1	<0.1	2
4227	*Astarte* sp.	Astartes	Astartes	26	0.1	73
8396	*Asterias rubens*	Astérie boréale commune	Purple Seastar	1	<0.1	1

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8390	Asteroidea	Étoiles de mer	Sea Stars	1	<0.1	1
8113	*Atlantopandalus propinqvus*	Crevette	Shrimp	16	0.5	125
2097	*Atolla wyvillei*	Méduse	Jellyfish	2	0.1	2
2085	*Aurelia aurita*	Méduse de lune	Moon Jelly	1	<0.1	1
5678	*Axionice maculata*	Polychète	Terebellid worm	1	<0.1	2
6595	Balanidae	Balanes	Barnacles	2	<0.1	14
4102	*Bathyarca* sp.	Bivalves	Bathyarks	1	<0.1	1
4904	*Bathypolypus bairdii*	Poulpe	North Atlantic Octopus	42	2.9	72
3995	Bivalvia	Bivalves	Bivalves	4	<0.1	6
2158	*Bolocera tuediae*	Anémone de mer	Anemone	56	18.1	488
8793	*Boltenia echinata*	Cactus de mer	Cactus Sea Squirt	4	0.1	25
8792	*Boltenia ovifera*	Patate de mer	Sea Potato	15	9.9	124
3488	*Boreotrophon* sp.	Murex	Murex	1	<0.1	1
8798	*Botrylloides* sp.	Ascidie	Tunicate	6	0.1	-
5755	*Brada inhabilis*	Polychète	Flabelligerid worm	5	<0.1	5
8378	*Brisaster fragilis*	Oursin coeur	Heart Urchin	66	206.3	24925
2670	Bryozoa	Bryozoaires	Bryozoans	12	<0.1	-
3520	*Buccinum cyaneum*	Buccin bleu	Bluish Whelk	16	0.9	60
3523	*Buccinum scalariforme*	Buccin	Ladder Whelk	5	<0.1	7
3516	*Buccinum* sp.	Buccins	Whelk	6	0.3	26
3517	*Buccinum undatum*	Buccin commun	Waved Whelk	9	0.1	10
8173	*Calocaris templemani*	Crevette fouisseuse	Lobster Shrimp	5	<0.1	8
8206	*Cancer irroratus*	Crabe commun	Common Rock Crab	1	0.2	1
2684	Celleporina	Bryozoaire marin	Marine Bryozoan	1	<0.1	-
2685	*Celleporina surcularis*	Bryozoaire marin	Marine Bryozoan	3	<0.1	-
4545	Cephalopoda	Céphalopodes	Cephalopods	1	<0.1	1
8429	*Ceramaster granularis*	Étoile de mer	Sea Star	13	0.6	29
8213	*Chionoecetes opilio*	Crabe des neiges	Snow Crab	88	96.2	652
6593	*Chirona hameri*	Balane turbané	Turban Barnacle	4	0.6	24
4167	*Chlamys islandica*	Pétoncle d' Islande	Iceland Scallop	8	0.7	18
4351	*Ciliatocardium ciliatum*	Coque d'Islande	Iceland Cockle	5	0.5	20
3908	*Colga villosa*	Nudibranche	Nudibranch	3	<0.1	3
3577	*Colus pubescens*	Buccin	Hairy Whelk	5	0.1	5
3575	*Colus* sp.	Buccins	Whelks	1	<0.1	1
3576	*Colus stimpsoni*	Buccin	Whelk	1	<0.1	1
8447	*Crossaster papposus*	Soleil de mer épineux	Spiny Sun Star	17	0.5	58
3422	*Cryptonatica affinis*	Lunaties	Arctic moonsnail	4	<0.1	4
8407	*Ctenodiscus crispatus*	Étoile de mer	Mud Star	82	49.8	12639

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8312	*Cucumaria frondosa*	Concombre de mer	Orange Footed Sea Cucumber	3	0.2	3
4526	*Cuspidaria glacialis*	Mye	Gacial Dipperclam	18	0.1	99
4525	*Cuspidaria* sp.	Myes	Dipperclams	1	<0.1	3
2080	*Cyanea capillata*	Crinière de lion	Lion's Mane	72	94.5	118
4268	*Cyclocardia borealis*	Vénéricarde boréale	Northern Cyclocardia	2	<0.1	5
8761	*Dendrodoa pulchella*	Ascidie	Tunicate	3	<0.1	4
3895	*Dendronotus niveus*	Nudibranche orangé	Orange Nudibranch	2	<0.1	2
8408	*Diplopteraster multipes*	Étoile de mer	Sea Star	1	<0.1	1
2191	*Drifa glomerata*	Corail mou	Soft coral	25	0.7	-
2183	*Duva florida*	Corail mou	Sea Cauliflower	8	0.1	17
8373	*Echinarachnius parma*	Dollar de sable	Common Sand Dollar	3	0.5	27
7383	*Epimeria loricata*	Gammaride	Gammarid	5	<0.1	24
2157	*Epizoanthus* sp.	Anémone de mer	Sea Anemone	20	<0.1	100
8075	*Eualus fabricii*	Bouc Arctique	Arctic Eualid	8	0.1	211
8081	*Eualus gaimardii belcheri*	Bouc	Circumpolar Eualid	1	<0.1	1
8080	*Eualus gaimardii gaimardii*	Bouc	Circumpolar Eualid	6	0.3	270
8077	*Eualus macilentus*	Bouc du Groenland	Greenland Shrimp	14	2.7	2351
8074	*Eualus* sp.	Bouc	Eualid	5	<0.1	-
8778	*Eudistoma vitreum*	Ascidie	Tunicate	12	0.2	71
5461	*Euphrosine borealis*	Polychète	Seaworm	1	<0.1	1
8033	*Eusergestes arcticus*	Crevette	Shrimp	4	<0.1	12
7195	*Eusirus cuspidatus*	Gammaride	Gammarid	2	<0.1	3
3437	*Euspira pallida*	Lunatie du Groenland	Pale Moonsnail	8	<0.1	13
2295	Fecampiidae	Vers flats	Flatworms	7	<0.1	6
2224	*Flabellum alabastrum*	Madrépore	Cup coral	5	0.2	25
2184	*Gersemia rubiformis*	Corail mou	Sea Strawberry	16	0.1	-
5902	*Golfingia margaritacea*	Sipunculide	Sipunculid	1	<0.1	1
4770	*Gonatus fabricii*	Encornet atlantoboréal	Boreoatlantic Armhook Squid	1	<0.1	1
8540	*Gorgonocephalus* sp.	Gorgonocéphales	Basket Stars	26	49.2	328
2217	*Halipteris finmarchica*	Plume de mer	Sea pen	16	5.4	353
5934	*Hamingia arctica*	Échiure	Echiurid	1	<0.1	2
8263	*Heliometra glacialis*	Lis de mer	Feather star	5	<0.1	22
1131	*Hemigellius arcofer*	Éponge	Sponge	1	0.6	-
3090	*Hemithiris psittacea*	Brachiopode	Lamp Shell	9	0.2	137
8483	*Henricia* sp.	Étoiles de mer	Sea Stars	36	0.3	105
4437	*Hiatella arctica*	Saxicave arctique	Arctic Saxicave	3	<0.1	3
8431	*Hippasteria phrygiana*	Étoile de mer	Sea Star	32	14.4	55
8154	*Homarus americanus*	Homard américain	American Lobster	1	0.9	1

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
2150	*Hormathia digitata*	Anémone	Anemone	21	0.8	139
2167	*Hormathia nodosa*	Anémone noduleuse	Rugose Anemone	3	0.3	7
8217	*Hyas araneus*	Crabe lyre	Atlantic Lyre Crab	18	2.5	278
8218	*Hyas coarctatus*	Crabe lyre	Arctic Lyre Crab	32	9.2	1409
1341	Hydrozoa	Hydrozoaires	Hydrozoans	29	0.1	-
6977	*Hyperia galba*	Hypéride	Hyperiid	2	<0.1	3
4753	*Illex illecebrosus*	Encornet rouge nordique	Northern Shortfin Squid	108	580.1	2959
5003	*Laetmonice filicornis*	Polychète	Seaworm	33	0.2	145
8092	*Lebbeus groenlandicus*	Bouc	Spiny Lebbeid	12	2.4	608
8095	*Lebbeus microceros*	Bouc	Shrimp	2	<0.1	2
8093	*Lebbeus polaris*	Bouc	Polar Lebbeid	37	1.1	716
8091	*Lebbeus* sp.	Boucs	Lebbeids	2	<0.1	-
8513	*Leptasterias groenlandica*	Étoile de mer du Groenland	Greenland Sea Star	7	<0.1	13
8511	*Leptasterias polaris*	Étoile de mer polaire	Polar Sea Star	6	0.9	15
8521	*Leptychaster arcticus*	Stellérídé	Sea Star	2	<0.1	2
2207	*Liponema multicorne*	Anémone	Sea anemone	8	0.8	28
8196	*Lithodes maja*	Crabe épineux du Nord	Norway King Crab	50	36.2	104
2050	*Lucernaria quadricornis*	Lucernaire à quatres cornes	Horned Stalked Jellyfish	1	<0.1	1
4395	*Macoma calcarea*	Bivalve	Chalky Macoma	5	<0.1	41
5309	*Maldane sarsi*	Polychètes	Bamboo worm	1	<0.1	1
3219	*Margarites costalis*	Margarite rosé du Nord	Boreal Rosy Margarite	9	<0.1	25
3216	*Margarites groenlandicus*	Troque	Greenland marguerite	1	<0.1	2
4025	*Megayoldia thraciaeformis*	Bivalve	Broad Yoldia	29	4.2	845
8322	*Molpadia oolitica*	Holothurie	Sea Cucumber	1	<0.1	1
8164	*Munidopsis curvirostra*	Munidopsis curvirostra	Squat Lobster	11	<0.1	69
4128	*Musculus discors*	Moule lisse	Discordant mussel	1	<0.1	1
4126	*Musculus* sp.	Moules	Mussels	1	<0.1	1
4121	*Mytilus* sp.	Moules	Mussels	4	0.1	11
3000	Nemertea	Némerte	Ribbon Worm	4	<0.1	6
2219	Nephtheidae	Coraux mous	Soft corals	16	0.2	-
5113	*Nephtys* sp.	Polychète errante	Red-Lined Worm	3	<0.1	3
3566	*Neptunea decemcostata*	Neptunée à dix côtes	Wrinkle Whelk	1	<0.1	1
3565	*Neptunea* sp.	Buccins	Whelks	1	<0.1	1
4019	*Nuculana* sp.	Bivalves	Nutclams	2	<0.1	3
5961	*Nymphon* sp.	Araignées de mer	Sea Spiders	24	<0.1	85
8575	*Ophiacantha bidentata*	Ophiure épineuse	Brittle Star	9	<0.1	31
8583	*Ophiopholis aculeata*	Ophiure paquerette	Daisy Brittle Star	46	0.6	448
8585	*Ophioscolex glacialis*	Ophiure	Brittle star	21	<0.1	74

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8552	*Ophiura robusta*	Ophiure	Brittle Star	1	<0.1	4
8553	*Ophiura sarsii*	Ophiure	Brittle Star	60	17.2	9113
8530	Ophiuroidea	Ophiures	Brittle Stars	5	<0.1	30
8178	*Pagurus* sp.	Bernard hermite droitier	Hermit Crab	12	0.1	27
8111	*Pandalus borealis*	Crevette nordique	Northern Shrimp	114	1721.8	287750
8112	*Pandalus montagui*	Crevette ésope	Striped Pink Shrimp	77	246.2	79600
8057	*Pasiphaea multidentata*	Sivade rose, Crevette blanche	Pink Glass Shrimp	67	53.4	16544
8781	*Pelonaia corrugata*	Ascidie	Tunicate	1	<0.1	1
2203	*Pennatula aculeata*	Plume de mer	Sea Pen	77	2.4	1142
2201	Pennatulacea	Plumes de mer	Sea Pens	2	<0.1	40
2096	*Periphylla periphylla*	Méduse à coronne	Crown jellyfish	36	62.2	51
2255	*Pleurobrachia pileus*	Groseille de mer ronde	Sea Gooseberry	15	0.1	97
3578	*Plicifusus kroeyeri*	Colus	Arctic Whelk	2	<0.1	2
8783	*Polycarpa fibrosa*	Ascidie	Tunicate	3	0.4	280
4950	Polychaeta	Polychètes	Polychaetes	49	0.6	235
1109	*Polymastia* sp.	Éponge	Sponge	15	0.4	35
5007	Polynoidae	Polychète errante	Fifteen-Scaled Worm	22	0.1	37
5264	*Polyphysia crassa*	Polychète	Sea worm	3	<0.1	3
8135	*Pontophilus norvegicus*	Crevette	Norwegian Shrimp	79	2.9	1708
8435	*Poraniomorpha* sp.	Étoile de mer	Sea star	5	0.2	6
1101	Porifera	Éponges	Sponges	86	23.4	-
2573	*Priapulus caudatus*	Priapulide	Priapulid	2	<0.1	2
8433	*Pseudarchaster parelii*	Étoile de mer	Sea Star	14	0.3	29
5935	*Pseudobonellia iraidii*	Bonellie	Spoon Worm	1	<0.1	1
8520	*Psilaster andromeda*	Étoile de mer	Sea Star	13	6.1	1136
8294	*Psolus phantapus*	Holothurie	Sea Cucumber	2	<0.1	3
8410	*Pteraster militaris*	Étoile de mer	Sea Star	7	0.1	13
8412	*Pteraster obscurus*	Étoile de mer	Sea Star	1	<0.1	1
8411	*Pteraster pulvillus*	Étoile de mer	Sea Star	8	<0.1	14
8409	*Pteraster* sp.	Étoiles de mer	Sea stars	1	0.1	18
2210	*Ptilella grandis*	Plume de mer	Sea Pen	27	75.8	2510
2153	*Ptychodactis patula*	Anémone beige évasée	Anemone	2	<0.1	2
1353	*Ptychogena lactea*	Méduse	Jellyfish	12	1.1	327
1107	*Radiella hemisphaerica*	Éponge	Sponge	13	1.1	208
7211	*Rhachotropis aculeata*	Gammaride	Gammarid	7	<0.1	23
1380	Rhodaliidae	Siphonophore benthique	Benthic siphonophore	9	0.2	44
4557	*Rossia* sp.	Sépioles	Bobtails	35	0.5	69
8129	*Sabinea sarsii*	Crevette	Sars Shrimp	5	0.1	105

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8128	*Sabinea septemcarinata*	Crevette	Sevenline Shrimp	15	0.4	156
8127	*Sabinea* sp.	Crevette	Shrimp	2	<0.1	13
3491	*Scabrotrophon fabricii*	Murex	Murex	4	<0.1	5
3715	*Scaphander punctostriatus*	Céphalaspide	Giant Canoe Bubble	23	0.2	80
8119	*Sclerocrangon boreas*	Crevette de roche	Scultured Shrimp	16	21.7	2234
2040	Scyphozoa	Scyphozoaires	Scyphozoans	7	0.3	44
2679	*Securiflustra securifrons*	Bryozoaires marins	Marine bryozoans	3	<0.1	-
8035	*Sergia robusta*	Sergistidé écarlate	Scarlet Sergestid	1	<0.1	1
4191	*Similipecten greenlandicus*	Pétoncle	Greenland Glass-Scallop	2	<0.1	2
8445	*Solaster endeca*	Soleil de mer pourpre	Purple Sunstar	6	0.6	8
8087	*Spirontocaris liljeborgii*	Bouc épineux	Friendly Blade Shrimp	29	0.2	135
8084	*Spirontocaris* sp.	Bouc	Blade Shrimp	10	0.1	-
8085	*Spirontocaris spinus*	Bouc perroquet	Parrot Shrimp	13	1.2	573
7750	*Stegocephalus inflatus*	Gammaride	Gammarid	3	<0.1	3
8570	*Stegophiura nodosa*	Ophiure	Brittle Star	1	<0.1	1
8515	*Stephanasterias albula*	Étoile de mer	Sea star	5	<0.1	12
2159	*Stephanauge nexilis*	Anémone de mer	Sea anemone	13	1.4	146
2173	*Stomphia coccinea*	Anémone marbrée	Anemone	24	0.7	66
8363	*Strongylocentrotus* sp.	Oursins	Sea Urchins	38	14.2	744
1112	*Stylocordyla borealis*	Éponge	Sponge	15	<0.1	191
6791	*Syscenus infelix*	Isopode	Isopod	58	0.8	548
1108	*Tentorium semisuberites*	Éponge	Sponge	11	<0.1	30
3101	*Terebratulina septentrionalis*	Térébratule du Nord	Northern Lamp Shell	11	<0.1	34
6972	*Themisto libellula*	Hypéride	Hyperiid	8	<0.1	164
1114	*Thenea muricata*	Éponge	Sponge	2	0.2	9
1357	*Thuiaria thuja*	Hydrozoaire	Bottlebrush Hydroid	4	<0.1	7
2152	*Urticina crassicornis*	Anémone de mer	Sea Anemone	1	<0.1	2
3452	Velutinidae	Gastéropode	Snail	1	<0.1	1
1127	*Weberella bursa*	Éponge	Sponge	3	1.6	10
4074	*Yoldia* sp.	Bivalves	Bivalves	1	<0.1	1
	Total	**Invertebrés**	**Invertebrates**		3 765	471 015

Others

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
9970	-	Capsule de raies	Skates Eggs	1	<0.1	
9965	-	Capsule de raie lisse	Smooth Skate egg	2	<0.1	3
9966	-	Capsule de raie épineuse	Thorny Skate egg	16	0.8	28

Appendix 3. Number of measured and weighed specimens and descriptive statistics for the length in 2020. Taxonomic codes (STRAP) follow Miller and Chabot (2014), with scientific name updates by the World Marine Species Registry (WoRMS 2018, http://www.marinespecies.org).

Vertebrates

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1*	Median	P99*	Max
90	*Amblyraja radiata*	1090	405	10.0	11.4	35.4	63.4	78.2
696	*Ammodytes* sp.	7	6	8.2	8.2	15.0	20.2	20.2
700	*Anarhichas lupus*	199	79	9.8	9.9	25.4	75.3	77.0
701	*Anarhichas minor*	7	7	29.4	29.4	81.0	92.0	92.0
718	*Anisarchus medius*	17	5	11.3	11.3	13.1	15.8	15.8
320	*Arctozenus risso*	397	134	17.6	18.5	23.3	27.5	28.1
193	*Argentina silus*	169	62	7.6	7.6	17.0	33.5	37.6
811	*Artediellus atlanticus*	112	32	5.1	5.2	8.1	12.1	13.4
810	*Artediellus* sp.	48	18	4.4	4.4	7.1	9.9	9.9
812	*Artediellus uncinatus*	50	33	5.5	5.5	7.0	8.5	8.5
838	*Aspidophoroides monopterygius*	101	26	6.7	7.3	12.7	15.4	15.4
837	*Aspidophoroides olrikii*	3	3	6.0	6.0	7.1	8.1	8.1
102	*Bathyraja spinicauda*	1	1	123.0	123.0	123.0	123.0	123.0
451	*Boreogadus saida*	198	71	4.6	4.8	12.0	17.3	18.7
865	*Careproctus reinhardti*	9	6	7.5	7.5	11.1	15.4	15.4
27	*Centroscyllium fabricii*	403	116	14.3	14.8	44.1	67.2	73.8
150	*Clupea harengus*	734	94	14.0	17.1	26.3	37.4	40.1
721	*Cryptacanthodes maculatus*	12	4	22.4	22.4	26.0	63.8	63.8
982	*Cryptopsaras couesii*	1	1	20.9	20.9	20.9	20.9	20.9
849	*Cyclopterus lumpus*	65	60	8.6	8.6	24.4	41.9	41.9
461	*Enchelyopus cimbrius*	1033	174	5.6	11.7	19.5	27.5	30.0
711	*Eumesogrammus praecisus*	169	31	7.6	10.0	14.3	22.4	23.0
847	*Eumicrotremus terraenovae*	206	20	2.7	2.9	6.0	13.1	70.8
438	*Gadus morhua*	4515	1801	4.6	14.9	28.2	62.7	106.0
439	*Gadus ogac*	6	6	24.3	24.3	33.2	36.2	36.2
426	*Gasterosteus aculeatus aculeatus*	23	9	5.4	5.4	6.2	6.9	6.9
890	*Glyptocephalus cynoglossus*	2727	1676	6.3	9.3	28.1	42.8	48.9
205	Gonostomatidae	2	2	13.1	13.1	13.5	13.9	13.9
746	*Gymnelus viridis*	10	9	8.5	8.5	14.1	18.0	18.0
823	*Gymnocanthus tricuspis*	109	42	9.2	9.5	15.9	24.8	25.2
809	*Hemitripterus americanus*	1	0	39.4	39.4	39.4	39.4	39.4
889	*Hippoglossoides platessoides*	5281	2203	6.8	10.1	19.3	42.7	55.3
893	*Hippoglossus hippoglossus*	66	65	33.1	33.1	87.6	154.0	154.0
832	*Icelus spatula*	29	15	4.5	4.5	6.7	12.1	12.1
836	*Leptagonus decagonus*	267	51	6.7	7.1	18.0	21.9	23.7
717	*Leptoclinus maculatus*	288	70	8.0	8.5	12.5	18.3	19.3
891	*Limanda ferruginea*	183	66	12.9	17.5	25.2	37.5	37.6
868	*Liparis bathyarcticus*	44	27	3.0	3.0	11.5	26.5	26.5
966	*Lophius americanus*	13	13	6.0	6.0	65.0	103.2	103.2
716	*Lumpenus lampretaeformis*	200	57	15.4	16.3	28.3	40.6	42.1
750	*Lycenchelys paxillus*	1	1	22.2	22.2	22.2	22.2	22.2
752	*Lycenchelys verrillii*	1	1	10.8	10.8	10.8	10.8	10.8
727	*Lycodes esmarkii*	7	7	18.7	18.7	26.2	45.1	45.1
728	*Lycodes lavalaei*	56	37	10.3	10.3	25.2	45.4	45.4
726	*Lycodes* sp.	4	4	15.2	15.2	17.6	26.2	26.2
734	*Lycodes terraenovae*	2	1	24.3	24.3	29.9	35.4	35.4
730	*Lycodes vahlii*	122	47	10.5	11.1	17.9	39.3	40.9
91	*Malacoraja senta*	264	107	8.5	9.3	17.8	58.9	59.8
187	*Mallotus villosus*	1034	129	8.3	9.4	13.9	16.3	17.1
745	*Melanostigma atlanticum*	209	53	5.0	6.2	10.6	13.6	14.2
449	*Merluccius bilinearis*	98	94	13.0	13.0	27.1	39.9	39.9
271	Myctophiformes	7	4	9.0	9.0	14.1	16.1	16.1
818	*Myoxocephalus aenaeus*	6	6	13.6	13.6	20.4	23.4	23.4

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1*	Median	P99*	Max
820	*Myoxocephalus octodecemspinosus*	2	2	19.8	19.8	22.3	24.7	24.7
819	*Myoxocephalus scorpius*	145	72	4.2	4.3	27.7	39.1	40.5
12	*Myxine glutinosa*	1162	252	20.9	23.6	36.5	47.8	54.5
368	*Nemichthys scolopaceus*	2	2	45.3	45.3	68.6	91.8	91.8
478	*Nezumia bairdii*	1517	209	7.9	9.4	23.4	31.7	35.0
275	*Notoscopelus kroyeri*	12	12	11.5	11.5	15.1	16.4	16.4
874	*Paraliparis calidus*	10	7	7.1	7.1	9.8	11.1	11.1
856	*Paraliparis copei copei*	14	14	6.1	6.1	10.8	13.7	13.7
15	*Petromyzon marinus*	1	1	32.4	32.4	32.4	32.4	32.4
444	*Phycis chesteri*	461	286	14.8	16.9	26.3	37.9	44.2
443	*Pollachius virens*	1	1	75.1	75.1	75.1	75.1	75.1
244	*Polymetme thaeocoryla*	1	0	10.9	10.9	10.9	10.9	10.9
94	*Rajella fyllae*	1	1	9.6	9.6	9.6	9.6	9.6
892	*Reinhardtius hippoglossoides*	4645	2103	12.0	15.2	27.5	50.4	76.0
572	*Scomber scombrus*	268	85	6.9	7.3	11.1	32.2	36.8
398	*Scomberesox saurus saurus*	7	7	26.9	26.9	36.5	38.8	38.8
792	*Sebastes* spp.	13179	4372	3.1	8.1	22.5	35.5	47.5
24	*Squalus acanthias*	3	3	67.3	67.3	71.6	79.8	79.8
220	Sternoptychidae	1	1	4.7	4.7	4.7	4.7	4.7
373	*Synaphobranchus kaupii*	2	2	45.4	45.4	45.4	45.4	45.4
814	*Triglops murrayi*	571	86	5.2	7.0	11.6	16.1	19.3
447	*Urophycis tenuis*	508	478	13.8	21.9	36.9	65.6	88.6

Invertebrates

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1*	Median	P99*	Max
8138	*Argis dentata*	443	0	0.7	0.9	1.7	2.2	2.3
8113	*Atlantopandalus propinqvus*	83	0	1.2	1.2	1.8	2.3	2.3
8206	*Cancer irroratus*	1	0	11.1	11.1	11.1	11.1	11.1
8213	*Chionoecetes opilio*	609	20	0.7	1.0	4.6	12.5	13.3
8075	*Eualus fabricii*	99	0	0.5	0.5	0.8	1.1	1.1
8081	*Eualus gaimardii belcheri*	1	0	1.1	1.1	1.1	1.1	1.1
8080	*Eualus gaimardii gaimardii*	35	0	0.6	0.6	1.0	1.2	1.2
8077	*Eualus macilentus*	140	0	0.7	0.7	1.1	1.3	1.4
8074	*Eualus* sp.	1	0	0.9	0.9	0.9	0.9	0.9
8033	*Eusergestes arcticus*	6	0	1.6	1.6	1.7	1.9	1.9
4770	*Gonatus fabricii*	0	1	-	-	-	-	-
8154	*Homarus americanus*	0	1	-	-	-	-	-
8217	*Hyas araneus*	192	1	0.9	0.9	2.0	6.3	7.2
8218	*Hyas coarctatus*	401	7	0.8	0.9	1.9	4.9	6.7
4753	*Illex illecebrosus*	1834	358	10.6	14.7	21.0	24.7	27.2
8092	*Lebbeus groenlandicus*	162	0	0.5	0.8	1.5	1.8	1.9
8095	*Lebbeus microceros*	2	0	0.9	0.9	1.0	1.1	1.1
8093	*Lebbeus polaris*	214	0	0.6	0.7	1.0	1.4	1.5
8196	*Lithodes maja*	100	6	1.1	1.2	7.6	11.9	12.2
8111	*Pandalus borealis*	17519	28	0.6	1.0	2.1	2.8	3.1
8112	*Pandalus montagui*	1991	0	0.6	0.8	1.3	2.1	2.2
8057	*Pasiphaea multidentata*	2284	0	0.7	1.5	2.5	3.1	3.3
8135	*Pontophilus norvegicus*	951	0	0.7	0.8	1.2	1.7	1.8
8129	*Sabinea sarsii*	60	0	0.6	0.6	1.0	1.5	1.5
8128	*Sabinea septemcarinata*	57	0	0.8	0.8	1.2	1.7	1.7
8127	*Sabinea* sp.	1	0	1.4	1.4	1.4	1.4	1.4
8119	*Sclerocrangon boreas*	445	0	1.0	1.1	1.7	2.7	2.9
8035	*Sergia robusta*	1	0	2.2	2.2	2.2	2.2	2.2
8087	*Spirontocaris liljeborgii*	52	0	0.5	0.5	1.1	1.4	1.4
8084	*Spirontocaris* sp.	2	0	0.6	0.6	0.7	0.8	0.8
8085	*Spirontocaris spinus*	123	0	0.5	0.6	1.2	1.6	1.6

** P1 : 1st percentile   P99 : 99th percentile*